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GAS JOURNAL

LIGHT • HEAT • POWER • BYE-PRODUCTS

[Founded in 1849 as the "Journal of Gas Lighting."]

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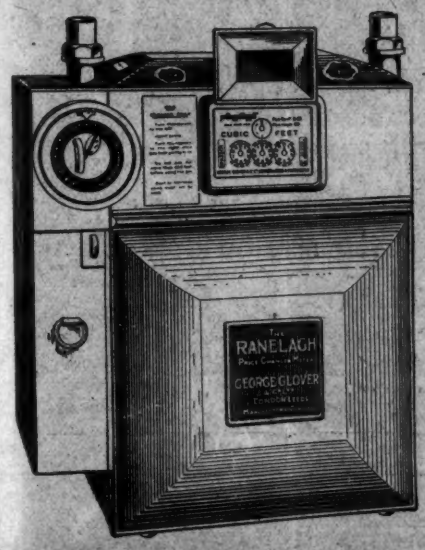

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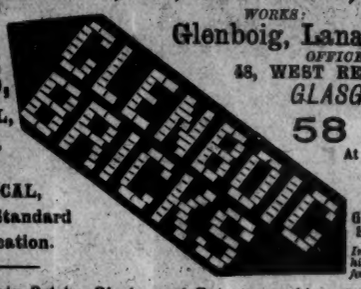

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VOL. CLXI., No. 3124.] WEDNESDAY, MARCH 28, 1923. [75TH YEAR.

EDITORIAL NOTES.

Is a New System of Charging for Gas Required?

FOR the purpose of accelerating the development of the consumption of gas by the individual consumer, do gas undertakings require a new system of charging—something altogether different from the common and simple flat rate, with its discount for prompt payment or for large consumption, or differential charges for industrial demands? Almost throughout the years the electricity industry has been in existence, its responsible men have been spending much time in devising new tariffs, for the purpose of securing larger output. Some of the plans put forward have been quite humorous through their bases having no relation whatever to the character of the supply; and several of them put the therm altogether out of court in the matter of confounding the consumer. The dissimilarity of the conditions of supply as between gas and electricity provides perhaps some excuse for the latter in departing from flat rates. However, let us preface references about to be made to a paper that Mr. W. B. M'Lusky, of Halifax, read at the Oldham Conference of the "B.C.G.A." last week, by saying this: If a new system of charging will increase the gas consumption of the individual consumer—whether domestic or industrial—more than the flat rate per therm or per 1000 c.ft. reduced as opportunity allows to the lowest possible point, then it follows that such a system is desirable, particularly if the larger consumption augments the day load, because this means a lowering per therm or per 1000 c.ft. of many of the general and distribution charges, which obviously would be an advantage to all consumers. There is considerable scope for the enlargement of business done through the individual service-pipe; but, unfortunately, in some cases there are to this obstacles of a no mean order—obstacles found in the conditions of the internal piping, and in some cases in the embarrassment which undertakings are experiencing in the rate of the growth of their connections, and this without any boosting-up by means of a new system of charging. Let us assume that there is room for a large increase of the day load, and that the conditions of consumers' house piping are such that there can be free development of consumption, then is a new system of charging necessary? Mr. M'Lusky replies in the affirmative. Admittedly the price of gas is a deterrent to rapid development of the consumption of the ordinary domestic consumer. It is this fact that causes our Halifax friend to counsel certain changes; and he does so on his own personal experiences, in his own circumstances, which add interest to his advocacy. Increased business per consumer means greater stability for the undertaking, and an extension of ability in rendering service.

In the first place, Mr. M'Lusky suggests that to encourage the consumer—especially the consumer of limited means—much could be done in the way of substantial reductions in the charges for all gas used in excess of the normal demand. Gas undertakings, he holds, could well afford to do this, because the increase in the demand for gas which would follow would immediately reduce the incidence of distribution costs per 1000 c.ft. There is, however, the hint that difficulties might arise in the case of gas companies working on a standard or basic price in relation to dividend; and that fresh legislation might be necessary in order to have the average net price paid per therm accepted as the standard or basic price. In making this suggestion, we do not think that Mr. M'Lusky has quite realized what would be likely to occur. The subscribers of capital to private gas enterprise would not want to see their standard or basic prices brought down to the level of the average net price received. This would make their position so much the worse for increments of dividend on reductions of price, and bring to narrow limits any margin they now possess, when costs are against the undertaking, before, in the case of standard dividends, these begin to shed some of their not too large substance. In the case of basic dividends, these remain at the basic level on increases of charge above the basic price; but the lower the basic price, the fewer the chances of an increase of the basic dividend on reductions of charge being made. With standard or basic prices on the net average charge, this would reduce the attractions to new capital. We see no reason for interfering at all with standard or basic prices, in the case of companies making "substantial reductions in the charges for all gas used in excess of the normal demand." Let us follow Mr. M'Lusky's argument for making the price concession with the view of stimulating individual demand. He states that the returns for industrial towns in the area in which Halifax is situated show an average consumption of not more than 15,000 c.ft. of gas per consumer per annum for at least 40 p.ct. of the consumers supplied. He puts the average cost of distribution—maintenance of mains, service-pipes, and meters—at 7d. per 1000 c.ft.; and the average cost at 15s. per annum per house per meter in use, or 1s. per 1000 c.ft. of gas sold, where the consumption is only 15,000 c.ft. per annum. If this low average annual consumption could be increased to 45,000 c.ft., the cost of distribution would be reduced to 4d. per 1000 c.ft. Thus it would come about that the small consumer who is now by his own limited demand making his gas supply too dear for his pocket would, by extended use, make it cheap enough for any purpose.

Some six years ago Halifax adopted a scheme of charging based on this idea. Reduced rates were offered for gas used in excess of what is called the "standard requirement"—a quantity which varies according to the floor area of the living or reception rooms. We do not like the arbitrary basis of floor area, inasmuch as some small families live in houses with large living or reception rooms; while large families are often crowded into houses where the floor area of those particular rooms would be much less. In this case the "standard requirement" would be pitched at a lower figure than in the instance of the small family with larger reception rooms, with the result that the large family with the rooms of small area would realize the reduced rate earlier than in the other case. However, upwards of 7000 users of gas for domestic purposes—or about 25 p.ct. of the whole number of the Halifax consumers—have adopted the scheme. Whatever the nature of the criticisms to which it may be exposed, the fact remains that it has proved efficacious in enlarging consumption. We should like to have had, if possible, the total result given, as "examples of some of the results" are always open to the suspicion that they are picked for the purpose of proving a case, though we do not suggest this is so in this instance. As a matter of fact, Mr. M'Lusky would have no end to serve in hoodwinking fellow engineers and managers in this way. A table in the paper gives the examples. Take case "A," the floor area is 188 superficial feet; the "standard requirement" is 7000 c.ft. In 1918, the consumption was 17,000 c.ft.; and the then cost of distribution (on the 15,000 c.ft. basis of 1s. per 1000 c.ft.) was 10½d. per 1000 c.ft. In 1922, the consumption was 30,000 c.ft.; and the cost of distribution was 6d. per 1000 c.ft.—a reduction of 4½d. Passing over the intermediate cases to the one indicated by F, there the superficial floor area is 772 ft.; the "standard requirement" 25,000 c.ft.; the consumption in

1918, 68,000 c.ft.; and the then cost of distribution, 3d. per 1000 c.ft. By 1922, the consumption had risen to 187,000 c.ft.; and the cost of distribution was 1d. per 1000 c.ft. If these are representative examples of the whole, then the scheme has fulfilled its objects. There is no doubt much persuasive influence in the idea of getting something cheaper when a certain point in consumption has been exceeded; and certainly the plan, though we have no admiration for the floor area basis, is perhaps better than a sliding-scale of prices for application to domestic consumption, which is so variable, and yet is not what would be called large-scale consumption.

Dealing with the industrial load, Mr. M'Lusky appears to have taken a leaf out of the electricity purveyor's book. He holds that satisfactory contracts could be made on the load factor. The basis might be the horse-power demanded, or the number of cubic feet equivalent to 1 B.H.P. required for power or any other purpose. He instances the working of the idea in this way: If the standing charge is £4 per horse-power, or its equivalent, per annum, the fixed charge for a 10 B.H.P. engine would be £40 per annum; and the charge per therm might be 1¼d., or any other figure which, with the quarterly first charge, would yield the total sum of money required. This is the two-part tariff of the electricity industry; and Mr. M'Lusky is of opinion that such a scale compared with electricity at £6 per KW., *plus* 1d. per unit of energy used, would prove very attractive. The system pays electricity undertakings; and why should it not be equally beneficial to gas undertakings in securing a larger business for manufacturing purposes?

Without pinning ourselves to the acceptance of the applicability of the proposals in all cases, nor to the exact form presented by Mr. M'Lusky, it may be submitted that in them there is something worthy of consideration and discussion. If a change from our old simple methods of flat-rate charging, with variations produced by discounts, sliding-scales, and differential prices for larger consumptions, will accelerate business development, then let it be made. Certain it is, if a particular system of charging is an attraction to patronage of a competitor, the gas industry must offer something that is equally, or more, attractive.

Auxiliaries of Economy and Efficiency.

There are some men who tell us that in its processes the gas industry has stood still practically from its birth. Those men must be speaking of the fundamentals, and are neglecting the magnificent developments which have been made from them, and which are equally as important to the economical operation, and therefore the stability, of the industry. If this is not the reason for their statement, then they are blind to all that has been done, and oblivious of the great work that remains to be accomplished, and which all students of the industry know to be there. Over a long experience of the gas industry we have never known a period that has been so alive with new plans and suggestions, all having for their object the realizing of higher economy and efficiency. And what also augurs well for the industry is that men are here, and more are coming along, whose technical training has been of a high grade, and whose critical faculties have therefore been developed, with the result that changes and developments are not now accepted merely upon the assessment of their inventors, but are subjected to very thorough scrutiny. Mr. Percy S. Hoyte, in the early part of his Presidential Address to the Southern Association of Gas Engineers and Managers last Thursday, made a sort of apology. So much important work, he said, is now being carried out by the various Committees of our Central Institution, and so much valuable ground is being covered, that even with the many problems pressing for solution by our industry, it is not really strange that a President should find himself somewhat "gravelled for lack of matter—at least really fresh and valuable matter—for his address." Mr. Hoyte did not find himself "gravelled for lack of matter;" and he had for his address plenty that was "really fresh and valuable." Who in the gas profession would have expected otherwise? For not only did a cheap and plentiful supply of therms pass from the Plymouth Gas-Works over a long period of years, and as cheap as circumstances would allow during the cost reverses of latter years, but it has been well known that the works of which the President has had charge for nearly thirty years have, under his progressive proclivities and foresight, grown into something which presents to the professional gas man a veritable mine of interest—no part being in the nature of embroidery, but each having its use and an end in contributory economy or service efficiency. That is the important point. It is no use in industry and business spending money on anything that has not in it utility subscribing to a beneficial end.

Before calling attention to some of the equipment which has been adopted for realizing additional economy or efficiency, there is one matter which has special current interest. The Plymouth Company's area of supply is largely a residential one. The inhabitants show a strong preference for gas for all purposes. Consequently, there is a restricted market for coke; and therefore over the past quarter of a century, the claims of economy and the interests of the consumers in obtaining gas as cheaply as possible, have encouraged the sound policy of making a substantial proportion of carburetted water gas. This policy had its wisdom expressed in a striking manner when, during the great coal strike, there was not at the port an ounce of coal; but at the gas-works there was the plant and the stock of coke for keeping Plymouth supplied with carburetted water gas. Was that a fortunate thing, or otherwise? We should like to hear what Prof. W. A. Bone and "The Times" have to say upon this. During those thirteen critical weeks, 40,000 consumers and their families were supplied with fuel for cooking and the means for lighting, and the lowest proportion of water gas in the total of gas supplied in any one week was 73·4 p.ct. In all the other weeks it was higher; and for three weeks neat carburetted water gas was distributed. The average for the thirteen weeks was 86·48 p.ct.! A community with such protective resources in respect of fuel is in a better position than a community without them. These figures and the experience at Plymouth Mr. Hoyte commends to the attention of those professors and pressmen who seem periodically to suffer from "carbon monoxide afflatus."

But to the point of this article, it is good engineering, policy, and management to make use on a works of anything and everything that will lead to genuine economy; and, as we have said, there is in this respect much of interest on the Plymouth gas-works. The works are admirably equipped for the reception of the raw materials—coal and oil. The wharf has accommodation for steamers up to 2500 tons, which are discharged by cranes into steam-wagons, which deliver into store or to any other part of the works. And the cost of doing this from ship to store, including capital and maintenance charges, does not exceed 14d. per ton. Oil is transmitted to the tanks by a steel pipe from the deep-water wharves; and the Company have now a railway siding. We here mention these points by way of introduction, for each one of them has been designed and adopted for the express purpose of contributing to the general economy of working. The delivery of coal brings to notice the first of the devices that cannot be said to be common to all gas-works. At the head of the coal-store elevator is an arrangement for automatically and continuously sampling each cargo of coal. In the fuel-using world, divers are the plans for taking fairly representative samples of coal. But there can be little question that, in the position at which Mr. Hoyte has placed this automatic device for securing continuous sampling, he succeeds in realizing a good representation of the whole, which does away with the inconsistencies that arise in such a matter from human volition or control. The horizontal retort-house is to be remodelled; and then we find another step is about to be taken in progressive economy by the addition to the carburetted water-gas sets of waste-heat boilers and automatically operated controls. There is the telpher coke-handling plant; and in this connection it is found that a "Columbus" washer deals with the ash from the retort-house furnaces and the water-gas plant generators. Through this plant during the past quarter, as much coke has been obtained as was secured by picking during the whole of the preceding twelve months. This fact is testimony to the efficiency of the plant, and to its good part in the general scheme for securing higher economy.

On the works there is a building in which is being assembled everything connected with the recording and controlling of make and distribution. That building will soon be a centre of much attraction. It will be at once the heart and pulse of the works and the distribution system. Accommodated in it will be the whole of the station meters, boosters, governors—all, in short, that is necessary for the efficient recording of make and output, and the maintenance of adequate pressures in the district. The Thomas meter,

which has been for the past two years in use for recording the production of carburetted water gas, will continue the same service in the building; and an electric flow-meter is being installed for recording the make of coal gas. The largest wet station meter is being removed, and the mains so arranged that it may be placed in series with either of the electric meters. This will enable the ascertaining of a proper correction factor, if such be needed, for the meter that is temporarily running alone. The result, the President says, will be economy of ground space and cost. Boosters are also provided which will relieve the back-pressure of the holders on the purifiers and other plant. The relief to the plant, as well as the fact that more purifiers are changed on account of back-pressure than fouling, will, in Mr. Hoyte's opinion, prove that the outlay has been worth while. There are the district boosters; and the switchboards for these supplied an interesting point. One of the illustrations shows a switchboard for the control of a pair of boosters; and an unusual feature is the association of all gas-pressure gauges within the same mounting as the control gear. The centre panel is equipped with two booster motor ammeters, a common inlet and outlet pressure-gauge, together with the Widlake distance pressure recorder. This disposition allows the operator to observe the results of his switch-gear manipulator without even taking his hands off the controls. It is now impossible for an operator to make a mistake by manipulating the wrong control gear, or referring to wrong instruments for information. The sum of ingenuity is not yet reached. Two other items are, like the distance pressure indicator, due to Mr. Widlake's untiring inventiveness. At this point we pause to acknowledge the recognition by Mr. Hoyte of the valuable work of a member of his staff—not only by word, but by practical application. When new ideas meet with the approval of a chief, such encouragement should be given to the members of any works' staff. One of the two items alluded to is the holder indicators, which show at any distance the height of the holders in feet and inches, from which the stock in cubic feet or therms may be easily arrived at by means of a conversion table. The other item is an apparatus for the remote control of holder inlet and outlet valves. There is agreement with the President that the quick and accurate recording of output and stocks at one spot is something which should be welcomed. He explains that the instrument, so far as its principles of working are concerned, resembles the distance pressure indicator, inasmuch as it regulates the flow of a current whose magnitude is at all times proportional to the height of the holder; the current being indicated on a meter which is calibrated in units of height.

We will here pass over the references in the address to the laboratory and experimental plant, in order to show how an important contribution has been made to the works economy by the substitution of electrical for steam power. It has been seen how intimately electricity enters into the plant and distribution controlling functions. The power requirements of a gas-works being scattered and individual, electricity has peculiar claims as the medium; and the President has taken advantage of the convenience of application in a manner for which he presents ample justification, having regard to the relative wastefulness of the old steam plant. In the address, there is a description of the batteries of steam-boilers as existing in 1910. But in this connection, we are only interested in three 30 ft. by 8 ft. Lancashire boilers situated adjacent to No. 1 retort-house, the total load supplied by which in that year was approximately 120 B.H.P., while the yearly output was probably in the neighbourhood of 200,000 B.H.P.-hours. Then, in a comparatively small way, electrical plant was installed for new stoking machines, telphers, and coke plant. Progressively, the generating sets were supplemented; and now for the result: The power output in 1911 was 213,000 B.H.P.-hours; and last year it was 812,000 B.H.P.-hours. In 1911, six electric motors were employed; now there are between seventy and eighty. The motor B.H.P. installed in 1911 was 80; last January, it was 823; and before long it will be 1083. What has happened through the change? In 1910, No. 1 house boilers had to be worked to their maximum capacity, in order to supply, with steam plant, an annual output of about 200,000 B.H.P.-hours. To-day, the same boilers use less fuel, and supply an annual load equivalent to 812,000 B.H.P.-hours. The cost works-out to 1·11d. per B.H.P.-hour, including fuel (coke breeze at 10s. per ton), capital, and labour charges. The cost of the electrical power delivered at the dynamo switchboard works-out at 0·73d. per unit for the annual output of 1 million units. Our electrical friends will be interested in this, as their general view is that a private plant cannot (irrespective of the value of its reliability) compete with a supply from the town cables. The curves in the address demonstrate the striking economies effected.

There was much more in the address. Among other things, distribution reorganization was referred to, as well as the work of the sales department; and a pat on the back was given to the "B.C.G.A." The technical education scheme was praised, as the President is one of those who want to see the old industry in which he has had such good place and part manned, as time passes and requirements and responsibilities grow, by adequate competence. But the cardinal feature of the address was the one to which we have called attention—the application of auxiliaries and changes in plant to bring into account fresh economies and efficiencies in both work and service. Plymouth is an outstanding example, and in some respects a pioneer, in this regard.

The Ideal Home.

THE Ideal Home Exhibition at Olympia has had its run. There were features about it that struck one as much the same as those of previous similar displays; but observant visitors were not slow to see that excellent progress has been made in certain of those things which go to make the ideal home. But what is an ideal home? The exhibition attracted many thousands of people; and they were interested. But if those thousands had been asked the question before they visited Olympia, a large proportion would no doubt have given speedy evidence that a single view comprised their notions of an ideal home. Some would have said that an ideal home was a house with rooms decorated and furnished artistically and for comfort; others would have probably declared that the aids to domestic economy and efficiency, cleanliness, and labour-saving were the things that made the home ideal; while others would have emphasized the design of the house that rendered it convenient for domestic and social life, with the amenities provided by the garden not overlooked. But the fact of the matter is, all these things have to be brought into a whole to make the ideal home; and, if of the right order, the temperaments of the people in the home give it the finishing condition. We cannot all attain to our own ideals (some people have not any) of what is a perfect home; but everyone of us with an ideal of any kind in this direction can try to realize it—at any rate, where there is the will, there is the way to do something towards it. Naturally, the nearest approach we can make to it is largely governed by the pocket; but fortunately the ideal home in matters of utility does not mean extravagance. The ideal home that embodies those things that produce good effect in the most economical way is a more perfect conception than one that does the same thing in an extravagant way.

The point is illustrated by electricity and gas. One cannot say that room heating, water heating, and cooking with costly electricity as the agent—an agent that has been generated by wasting so large a proportion of the valuable potential heat of coal and all the other constituents which are essentials to industries—is an ideal method. The very fact that the duty has been obtained in such an expensive manner, while it can be rendered equally satisfactorily by gas, with less expenditure of money and time, cannot be ideal, because uneconomy at all times is the antithesis of that. Again, the home that harbours the creators of dirt and dust, and causes an insanitary atmosphere, is not ideal in that respect. Therefore, between expensive and inefficient electricity and fouling coal, gas stands out prominently as the ideal system for all domestic heating requirements; and it is not prepared, as the exhibition at Olympia proved, to take second place as a lighting agent, both from the economical and the qualitative aspects, as well as in respect of decorative merit. At the exhibition electricity was not strong in anything other than general and stand lighting, and electrically-operated vacuum cleaners and washing-machines. There were few electric heaters and cookers to be seen; the fact being that the manufacturers find it a weary journey to popularity, and expensive exhibitions over a long series of years have not shown profitable returns. As an aid to domestic economy and efficiency, gas made a magnificent display—particularly so the exhibit of the eight London Gas Companies, the chief beneficiaries of the display, though other gas undertakings will have benefited

through people from all parts of the country who have been in London, and found Olympia convenient for inclusion in their ambit of visits. Several manufacturers of gas appliances also did well. At all the gas stands everything was shown in appropriate settings; and many were the "live" exhibits—demonstrating what could be done, and supplying the inquirer with the expenditure for doing it. The public are lamentably ignorant as to what individual operations by gas cost at 9d. or any other price per therm, as compared with electricity; but the huge popularity of gas, contrasted with the slender use of electricity for those things in which thermal energy is required, is testimony to the spreading knowledge of the results of experience, and to the ability of the public to make a shrewd guess where such knowledge does not exist. Of course, the lack of knowledge as to the cost of individual operations is due to the common measurement of household gas, and consequently and unavoidably to the whole of the uses of gas being wrapped together without distinction in the total of the gas account. And to-day, gas has such manifold uses, as seen on the stands and in the flats and bungalows at Olympia. In every direction the gas appliances showed improvements in detail—making for utility, efficiency, and economy. The public were pleased and edified; and reports from the exhibition satisfy us that many a home will move forward another stage towards the ideal state by the adoption of an appliance or appliances in which gas is the active agent.

Gas Workers' Wages.

Under the sliding-scale agreements, the National Joint Industrial Council for the gas industry have decided that the wages of gas workers shall be reduced by ½d. per hour—the reductions to carry a deduction, where the undertakings are entitled to make it, of the 12½ p.ct. or the 7½ p.ct. bonus in respect of workmen of 21 years of age and over. In the case of shift workers, the reduction will be 4d. per shift. The reduction could have been made on April 1; but, owing to the intervention of the Easter Holidays, it was thought advisable that it should not be put into operation before April 9.

Coal-Purchasing Specification.

A good deal of attention is being given to the question of the conditions for purchasing gas coal. On the one hand we hear of colliery representatives disagreeing with conditions as to ash content; and they want to suit their own convenience and working economy rather than those of their customers. On the other hand, another colliery representative agrees that it would be a good thing—particularly for steam-raising purposes—to purchase coal on a thermal basis. Now Mr. Percy S. Hoyte, of Plymouth, in his Presidential Address to the Southern Association of Gas Engineers and Managers, suggests a new piece of work for the Institution of Gas Engineers or the National Gas Council. He says that one or the other of these bodies might well turn its attention to a specification for the purchase of coal. He admits that it would be no light task; but if gas undertakings could, by such a standard form, be assured that at least good money was not spent in return for dirt and short weight, it would be well worth the trouble.

Taxation of Motor Fuel.

If there is a change made from the taxation of horse power to motor fuel for road vehicles, it does not seem likely that it will happen yet. A deputation representing a number of motor organizations was received by the Parliamentary Secretary of the Ministry of Transport last Friday. They pressed the importance of the Government's adopting a system of taxation based on fuel consumption; but, so far as we can gather, nothing was said as to differentiating between imported and home-produced motor spirit. Another point urged was that the change should be made by Jan. 1 next. It was acknowledged by Colonel Ashley that the Department are not opposed in principle to a tax on motor fuel. He doubts, however, whether the report of the Committee now considering the subject will be received in time for the matter to be dealt with in the Budget of this year. When the report is received, the Department will examine, with the competent authorities, the question as to whether any decision of the Committee can be carried into effect earlier than Jan. 1, 1925.

Summer Time.

It is officially announced that summer time will begin this year at 2 o'clock (Greenwich mean time), on the morning of Sunday, April 22, and will continue until 2 o'clock on the morning of Sunday, Sept. 16.

Smoke Abatement and Industry.

Industry does not appear to like the outlook in respect of tightening the legislative screw on manufacturing establishments in regard to the pollution of the atmosphere. It would, of course, be absurd to do this to such a point that economical production is adversely affected. Doubts and fears that exist as to new legislation are evidenced by the activities in the matter of the Federation of British Industries. Members of the Federation and a deputation representing Sheffield trades had an interview last Friday with the Parliamentary Secretary of the Ministry of Health (the Earl of Onslow), for the purpose of putting their views before him. The point was pressed by Professor W. A. Bone (Chairman of the Technical Fuel Economy Committee of the Federation) that it should be realized by those who were responsible for the introduction of legislation that they would, unless the greatest care was taken, imperil industry in this country, and absolutely ruin the commercial efficiency of trade. The impracticability of eliminating smoke in the present state of knowledge was urged on behalf of the Sheffield steel trades. Something was gained, but not definitely, by the interview. It was intimated by the Earl of Onslow that he would welcome for consideration suggestions which might be incorporated in the new Bill with the object of giving adequate protection to industry. The deputation suggested that protection should take the form of a definition of defence such as was incorporated in the report of Lord Newton's Committee—that a defendant was using the best practicable means, at a reasonable cost, to obviate any nuisance.

Gas Coal Exports.

The total quantity of coal exported in February was 5,902,630 tons; and although this is not such a high monthly total as has been experienced lately, when it is averaged over the working days of the month it is found to be sustaining recent history in respect of coal business for abroad. Both British coal and shippers are finding benefit from the Ruhr occupation—not only in the volume of business done, but in the prices realized. Of the tonnage of coal mentioned, 719,823 tons were classified as "gas coal;" and we are aware that there has been an abnormal demand from gas undertakings abroad. The figure compares with 518,132 tons in February, 1922, and 291,907 tons in February, 1921. The total value of the gas coal last month was £810,836, or an average of £1 2s. 6·3d. per ton. In the first two months of this year, 11,514,300 tons of coal were exported, of which 1,424,183 tons were gas coal. In the same period last year, the quantity was 1,019,855 tons.

Gas and Furnace Coke Exports.

The gas coke shipped last month amounted to 106,233 tons, the value of which was £152,927, or an average of £1 8s. 9·4d. per ton. The quantity exported in February, 1922, was 82,568 tons, and in February, 1921, 71,862 tons. The amount shipped in the first two months of this year was 200,688 tons, compared with 150,277 tons in the corresponding period of 1922, and 103,481 tons in 1921. The metallurgical coke exports have had a bumper increase in shipments; and this is attributable to the Ruhr situation. In February, the exports amounted to 146,662 tons, as compared with 106,018 tons in February, 1922, and 15,279 tons in February, 1921. The value of the metallurgical coke shipped last month was £250,192, or an average of £1 14s. 1·4d. per ton. In the first two months of this year, 327,513 tons of metallurgical coke were exported, as compared with 179,029 tons in 1922, and 35,341 in 1921. The "Iron and Coal Trades Review," commenting on the rise in the exports, makes the following reference to prices: "Last July the f.o.b. price of furnace coke was about 27s. 6d. and 27s. per ton delivered Middlesbrough. By the middle of February, the f.o.b. price had risen to 60s. per ton; and 34s. 6d. per ton delivered to East Coast furnaces. At present, blast-furnace coke for export is demanding 75s. per ton; and pig-iron makers in the Middlesbrough area have to pay from 39s. to 40s. per ton delivered. Of course, there is a huge gap between the

home and f.o.b. prices, though even at the comparatively low figure, the present price of blast-furnace coke in this country is causing a general rise in iron and steel prices."

Sulphate of Ammonia.

An excellent export business is being done in sulphate of ammonia. The quantity shipped in February was nearly double that of February, 1922. The respective figures are 22,159 tons and 11,751 tons. The amount exported during the first two months of the year was 45,995 tons, as against 28,605 tons in January and February last year.

PERSONAL.

His Majesty the King in Council has appointed Mr. C. S. GARLAND, M.P., to the Governorship of the Imperial College of Science, rendered vacant by the resignation of the Hon. Nathaniel Rothschild. Mr. Garland, who is Member of Parliament for South Islington, is Works Manager and Managing Director of the Volker Lighting Corporation, Ltd., the Clay Ring Company, Ltd., and Messrs. W. A. Ward & Co., Ltd., and a Director of Thorium, Ltd. He is also a Fellow of the Institute of Chemistry, Vice-President of the Society of Chemical Industry, and a member of the newly-formed Institution of Chemical Engineers. He has been responsible for the establishment and erection of many commercial plants for important chemical products.

Messrs. Settle, Speakman, & Co., Ltd., colliery proprietors, coal shippers, and factors, of Alsager, Liverpool, London, &c., have recently opened an office at Regent Chambers, No. 100, Deansgate, Manchester. Mr. T. M. PRIESTWOOD has been appointed Manager of the Fuel Department, and Mr. J. R. BAXTER Travelling Representative in Lancashire and Yorkshire for pig-iron.

Congratulations were extended at last Friday's meeting of the London and Southern District Junior Gas Association to Mr. T. V. JOHNS, of Richmond, on his appointment as Works Manager to the Lowestoft gas undertaking.

OBITUARY.

Friends of Mr. R. P. NORMAND (of Messrs. E. Foster & Co.), particularly those associated with the Evening Star Lodge and Evening Star Chapter, will, we are sure, very much regret to hear of the sudden death of his father, Mr. Ernest Normand, the artist, which took place on Friday afternoon in his studio at Norwood. We tender him our sincere sympathy in his loss.

ARCHITECTURE AND THE PRESS.

At a Meeting of the Circle of Scientific, Technical, and Trade Journalists on March 20, a delightful address on "The Attitude of the Press towards Architecture" was delivered by Prof. A. BERESFORD PITE, who sought to convey to his audience some conception of the ideals of the architect and the manner in which his art is moulded by history and tradition. Prof. Pite gave many curious and interesting instances of the manner in which historical events have influenced architecture—referring to the effect of the "Black Death," by which many of the greatest craftsmen perished, and the period of political isolation during Queen Elizabeth's reign, when literature flourished but architecture was almost at a standstill.

The lecturer said truly that it is impossible for a journalist to communicate at all fully the mental impressions to which fine architecture gave rise. But it is well that they should know something of the subject, and use their influence to promote a national pride in fine buildings and a desire for impressive and dignified treatment in conformity with the spirit of the age. Many other professions touch upon architecture. Those who have to do with heating and lighting will find their task greatly simplified if they understand something of the architect's point of view. Prof. Pite's remarks on the conditions necessary to good work should be endorsed by everyone. In referring to statements by Mr. Herbert Wills, he agreed with the definition of an "artist" as one who took a pleasure and a pride in his work—not regarding it merely as a "bread-and-butter" business. Gas engineers and journalists alike may thus be artists; and Mr. Frederick Peaker (President of the Institute of Journalists), who joined in the discussion, pointed out that there is a great deal of work done by journalists to-day that bears the stamp of creative and conscientious effort, and deserves to be regarded as art.

The meeting was attended by a number of leading architects, as well as technical journalists; and the Hon. Secretary (Mr. (Leon Gaster), in announcing the names of new members, issued a general invitation to technical journalists to join the Circle. It was stated that the next meeting would be held on May 1, when an address on "The Press and Industry" would be delivered by Mr. G. J. Wardle (late Parliamentary Secretary of the Ministry of Labour).

ELECTRICITY SUPPLY MEMORANDA.

THE therm has already become strongly established. It is being used freely to-day in technological circles as a handy unit for comparing fuels and the methods of obtaining heat and doing work. In the gas industry, over 60 p.ct. of the gas supplied by statutory undertakings is charged on the therm basis; and the percentage is week by week creeping up, and before long all gas sales by undertakings operating under Acts of Parliament will be by this system—leaving only the non-statutory companies charging by the old cubic foot unit. They, too, we venture to predict, will as time passes come into line. But an interesting feature is that, in communications to technical bodies nowadays, the therm is becoming quite the vogue when heat values of different fuels are being spoken of. Sir George Beilby a couple of years ago set the ball rolling in this direction in his James Forrest Lecture. We have since often met with the same thing. This use of the therm will extend; and electrical engineers and salesmen must expect to encounter it with growing frequency, and to see the fact put forward that about 29 units of electricity have a potential heating value of 1 therm, and that 29 units at common charges for heating purposes represent a substantial sum compared with a therm supplied by other agents. It will be of little use to talk of efficiencies; for electrical efficiencies for various heating operations cannot annihilate the large difference that exists between the costs of a therm supplied by coal, coke, or gas on the one hand and electrical energy on the other.

Growing Usage of the Therm.

Some time ago a correspondent of "Electrical Industries," signing himself "Pot Boiler," had what some electricians consider to be the audacity to put forward the point that, if electricity is to make any marked headway for cooking purposes, it will have to be sold at a rate that would compete with other agents for that work. This is only common sense; but there are electrical men who aver with an airiness totally devoid of that essential in human affairs that a therm of electricity costing 2s. 5d. or 3s. 7½d., and even 4s. 10d., will render as much duty to the consumer as a therm supplied by gas, and costing (say) 9d., or in some places less. The cost of an electrical therm is one drawback to electrical operation in the kitchen; and the very *nom de plume* of "Pot Boiler" points to another. It is the low and decreasing efficiency of the hotplate, which, combined with the expensive electrical therm, runs accounts up alarmingly, if the electric cooker is put to the same extensive use in the household as is the gas-cooker. And the modern gas-cooker has enlarged the efficiency of the hotplate; and it is no uncommon thing now to find that, with modern burners and open grids, efficiencies of 60 to 70 p.ct. can be obtained. "Pot Boiler" has now returned to the charge. He is anxious to see electric cooking developed; but he has been seeking for information which will convince him that all-round electrical operation can compete with gas in the matter of cost. He has failed to obtain satisfaction; and that is the experience of the public. The fixing of a few hundred electric cookers does not prove anything; it is the widespread adoption, and the eviction of other methods at a rapid rate, that tells of popularity. Many manufacturers, too, of electric cookers are not finding the encouragement that they anticipated.

No Satisfaction as to the Cost of Electric Cooking.

However, as remarked, "Pot Boiler" has sought, but has not found, the data to satisfy him as to the competitive strength of electricity for cooking in respect of cost. As he puts it, he has had "plenty of generalities, but no really reliable figures." And he speaks the truth when he says that, "in an area where gas cooking has been adopted to a very large extent, some definite figures and demonstrations have to be put up in order to induce people to adopt electric cooking in preference to gas; and this is particularly the case in industrial areas." The correspondent is not a little disappointed to find that very little is done by electrical people in the way of demonstration to show actual costs for comparison with the cost of doing a similar quantity of work with a gas-cooker. He finds showrooms containing, pots, pans, and cookers; but nothing in the way of demonstration. There is really little enthusiasm in this particular "corner" of the showroom. He has asked a manufacturer whether he would be willing, in the event of a supply authority providing accommodation in a good position in different parts of their area, and free current, to furnish an electric-cooker for demonstration purposes—say, temporarily. Since the suggestion was made, he has heard nothing more from the manufacturer. This astonishes him, seeing that gas suppliers have for years been giving such demonstrations, and have shown clearly the quantity of gas used. He would like to see whether current supplied at 1¾d. per unit can compete with gas varying between 4s. 6d. and 5s. per 1000 c.ft. That is rather a steep price for gas to-day, seeing that a very high percentage of the gas sold in this country is being charged for at prices at and below 3s. 9d. per 1000 c.ft., or, speaking more precisely, at and below 9d. per therm. However, the concluding

Comparative Demonstration Wanted.

words of "Pot Boiler" are: "I do feel that the manufacturers of the [cooking] apparatus could help things forward very much with demonstrations, providing they are satisfied that the figures of electric cooking can compare satisfactorily with those of cooking by gas. Actual figures that I have seen of comparative tests up to the moment do not demonstrate this." We are not surprised; and the manufacturers know that, no matter how much they talk of the "economy" of the oven, when householders start using an electric cooker, they soon move forward to the same liberal use that they formerly made of the gas-cooker—both oven and hotplate—and then come disappointment and bills that raise resentment and lower the contents of the pocket.

Glassware and Danger to Business and Eyesight.

The question of glassware is an important one in connection with electric lighting, in view of the noxious effects of the high intrinsic brilliancy of the metallic filament and gasfilled lamps. "Megohm," in "Electrical Industries," shows that the makers of these lamps recognized the importance from their advent. When the tungsten lamp was first introduced, he states that the makers lost no time in placing suitable shades on the market, and of size sufficient to cover the increase in the length of the lamp compared with the carbon filament type. Then, when large gasfilled lamps came on the scene some eight years ago, the makers were also very solicitous that proper shades or lanterns should be used to protect the eyes from the high intrinsic brilliancy of the filaments. But "Megohm" points out that, on the coming of the 60-watt and 40-watt gasfilled lamp, the matter of providing suitable shades seems to have been forgotten. These lamps, as he says and as most people are painfully aware, are too long for the glass shades designed for the vacuum lamps; and there is practically no variety from which to choose of shades suitable for gasfilled lamps in dwelling-houses. It is quite true that, unless these lamps are used in a bowl or dish, one usually sees them in shades far too shallow for them, with the bright filament staring one in the eyes. There is no reason whatever why British glass makers should not produce suitable bowls. They can do so at a reasonable price, and give prompt delivery. But the dealers apparently prefer to wait for deliveries from abroad, although the makers in other countries, owing possibly to their large patronage, take their own time to execute orders. But for the exotics the importers are quoting about two-thirds of the price charged by British makers. The fact is, unless the latter are encouraged, they will never be able to compete with other countries, as it is only by assistance through custom that they will be able to attain that strength in production that will enable costs to descend to a competitive level. This is one consideration. Another is that, if the men of the electricity industry did their duty in the matter of advising consumers not to use the metallic filament or gasfilled lamps without proper protecting glass, the demand would grow considerably. But observation suggests that with many electrical men damage to the electric lighting business seems to have a stronger pull than damage to the eyes.

Sound Advice.

The matter of the misuse of electric lamps in schools and colleges, we see from the "Electrical Review," has been taken up by the Electrical Development Association. They have issued a pamphlet which (we have to rely on our contemporary for the truth of the statement, though we have not the slightest cause for disbelieving it) "contains some sound advice on the use of electric lamps, and emphasizes the great importance of adequate illumination in the interests of the students." The "Review" refers to the recent discussion at a meeting of the Illuminating Engineering Society on the subject of training in electrical engineering; and it makes some remarks which can be readily endorsed by anyone with experience. It says: "There is one fact which must, one imagines, prove a difficulty to teachers—that in so many schools and colleges students are provided with object-lessons in bad lighting within the building, even in the room in which the lecture is delivered! The use of unscreened lamps and inefficient reflectors is still too common; and corridors are often allowed to remain in semi-darkness." And a little later on we read: "In these days it is not enough merely to purchase lamps. As the pamphlet [referred to above] remarks, one does not, in the true sense, buy light, still less buy electricity. The object in all cases is to buy illumination; and it is to the interests of both electricity supply undertakers and makers of lamps and fittings to emphasize this fact." The purveyors of electricity do not do much to show that they are taking the good advice to heart that has been given them for some years now, and is repeated again in the pamphlet of the Electrical Development Association.

Price and Value.

There was some sound counsel in an address that Lieut.-Col. W. A. Vignoles gave at a recent Salesmen's Conference in Newcastle-on-Tyne. There were also, as one would expect, some things with which we as competitors could not agree. We concur with him that, in respect of any commodity, price is not everything, though it goes a long way—for one reason because people's pockets are not all lined the same. But, generally speaking, it is true that the cheapest commodities have not in them nearly so much value for the user as dearer ones of the same type; but this is not an invariable rule for all goods or commodities. For instance, electricity has not in it the same heating value as gas for an equivalent expenditure; and so for a given thermal value it is much dearer. But if we turn to the appliances in which either gas or electricity is used, then it can be said with certainty that, in both lines, the cheapest appliances have not the same efficiency or durability as more expensive ones. There are some things in which cheapness is only secured by the use of inferior material and workmanship, and gas and electric appliances are among them. In both industries, cheap appliances do a vast amount of harm. This is an important matter; and it is one on which the public require to be educated, though, with the most persevering missionary work, the educational seed will fall in places on stony ground. Salesmanship may be of the highest order, but obstinacy and custom have sometimes a resisting strength that even the highest efficiency in salesmanship cannot master. But that is all the more reason for perseverance, because there is a large receptivity existing among the public, as there is of common sense, as well as capacity for weighing and determining relative merit in practical use. As was said in the address, it is educational work that is needed.

The Contractor and the Supply Authority.

Another matter, among others, that Lieut.-Col. Vignoles discussed was the relative points of view of the contractor and the supply authority; the "contractor," of course, in this case being the tradesman—the middleman, so to speak, between the supply undertaking and the manufacturer of the appliances. It is somewhat of a drawback in connection with both gas and electricity appliances that, after an appliance is sold and installed by a tradesman, his interest in it ceases. There is, therefore (as mentioned in the address), a tendency for a contractor to push the sale of cheap apparatus and novelties which possibly would not be satisfactory from the consumer's point of view. The interest of the supply authority is altogether different. There is, in fact, on its part a double interest. Unless the appliance does its work efficiently, gas or electricity gets a bad name, and not the appliance; there is dissatisfaction, and an adverse advertisement results. On the other hand, an appliance that is efficient and gives satisfaction is a good advertisement and a continuous source of profit to the supply undertaking, so long as it is in use, and the supply to it is rendered on a tariff rate that is profitable. There is one point on which we should be disposed to disagree with Lieut.-Col. Vignoles. He says the sphere of the electricity supply authority is to create the electrical atmosphere, leaving the detail work to the contractor. In this way he thinks much benefit would accrue to both. There is no objection to the creation of the electrical atmosphere. But if there could be specification of the appliances and methods of installation, with adequate supervision, there would not be much to say against the proposal. Electricity authorities can refuse supply to a house where the wiring does not come up to their requirements; but we do not think this applies to privately purchased appliances. At present the gas industry is worse off. Excepting where Private Acts make the provision, gas undertakings have no authority beyond the meter; and to this fact is due largely any inefficiency and discontent that exist. But we see the coming of a different state of things in this respect, particularly since the issue of the report of the Therm Charges Committee. Until there are advisory and supervisory powers over private installation work, there will be trouble, born of indifference and cutting of prices. To advise consumers, too, how to reduce their gas or electricity bills, and not to give them under-estimates of consumption, are good features that should be found in the commercial policy of every gas and electricity undertaking.

Southern Association Visit to Plymouth.—Members will make a careful note of the date fixed—Friday, May 25—for the visit of the Southern Association of Gas Engineers and Managers to the works at Plymouth of their President, Mr. P. S. Hoyte. They know that this visit will prove to be one of absorbing interest.

Manchester and District Junior Gas Association.—Saturday, April 7, has been fixed for the 23rd annual meeting of the Association. Prior to the meeting, members are invited to the new works of Messrs. Willey and Co., in Saville Street, Manchester, where they are requested to assemble at 3 o'clock. After viewing the works, they will partake of tea provided by the firm at the Grosvenor Hotel, Deansgate. This will be followed by the meeting and a smoking concert. The officers and members of Council for the ensuing year will be elected, and a proposition for a reduction of the annual subscription will be put before the meeting.

Labour Saving in Small Houses.—In the issue of the "JOURNAL" dated Feb. 21 (p. 466), reference was made to the report of an inquiry by a Sub-Committee of the Women's Section of the Garden Cities and Town Planning Association with the object of saving labour in small homes. One of the members of the Committee was Mr. F. W. Goodenough. Gas, of course, figures largely in the report as a domestic labour saver, which contains many practical points, and is of special value at the present time as a practical inquiry into the devices and arrangements employed in houses built since the war. The report has now been issued in pamphlet form (at the price of 9d.) by the Association, and is procurable from Messrs. P. S. King and Son, Ltd., Orchard House, Great Smith Street, Westminster, S.W.

COMMON SENSE IN BOILING-BURNERS.

By Maintenance.

There is a very ancient fable about a sheep-dog. The toothless old dog was little use when the wolf came. He was maligned and beaten, and a younger took his place. But there came a day when the sheep were lost; and none knew their ways or could find them like the old dog. Just now the wolf is here again; the old servant is in sad disgrace. The shepherds are rising in their wrath and condemning the poor beast. The fashion in dogs changes. So something fresh has been procured—not a young dog, for some say he is at least thirty years old—and one calls him, for want of a better name, "Continental." The new (they say) can make short work of the wolf, and can do many and marvellous things. Every dog has his day. Signs are not wanting that another's day is not yet past, for even now one of the criers of "Wolf! Wolf!" is bewailing the fact that the new is not so perfect as was first supposed.

So in the world of boiling-burners fashions change, and burners come and go. There is no gainsaying that there have been very many marked advances, some of them slow, but all sure, as befits an industry with a rather conservative past. There are people who now think that the ring burner has had favour enough; but it will put up a good fight for itself before its day is done. Others may come—and go—but the ring is still with us. Perhaps it has been with us a little too long; but there actually are responsible gas engineers who assert that it is still the better. One is not willing lightheartedly to condemn these gentlemen for pinning their faith to an inferior article. Even were every engineer wholly convinced that the "Continental" burner were the better, he would still have to meet prejudice as well as conviction, and keep his consumers satisfied. For if, as has been suggested, the mistress burned her plum jam with a "Continental" burner, all "Continental" burners would be bad. No gas engineer on earth would persuade her to use another.

The stories of the wonders of the newest burners make interesting reading. The consumer will at last be able to boil his turbot without the harassing thought of the gas bill; he will bless the name "Continental." But he must take care, or he will burn his sauce.

The old ring burner stands hopelessly condemned. There can be no doubt about that. He was a wasteful fellow. Why—when tested on an old cooker against one of the modern Continental burners in its modern setting, he could hardly show half the useful work of the other fellow. This will not do nowadays. But might not the suggestion be ventured that properly designed, and under an appropriate hotplate, the ring burner is efficient? Further, it might be perhaps hazarded that some ring burners are more efficient than some Continental burners when they are tested as they come from the makers' shops and not their laboratories. At low rates, a properly designed Continental burner will always beat a ring burner, both set for average cooking operations. But let the rate of heat supply increase, and the pan or kettle fall below a certain diameter, then the ring begins to score. Still, perhaps the Continental has a better average.

Apparently the cooking of sauces, stews, soups, and such, is not well done by the Continental burner. It has an awkward habit of burning these dainties. To overcome this, if a ring is fitted in conjunction with Continental burners, it is regarded as a confession of failure. Is it not more an honest endeavour to give people a rational solution of the difficulty?

From what we have seen of apparatus on the Continent, it is not what would appeal to a British consumer. There gas is for the few, and not the many. Perhaps they do not worry so much about efficiency, or are more able to afford inefficiency. Hence, to save burning the sauce they use the solid hotplate, or the *bain marie*. A poor way out of the difficulty! It would be more sensible to use a ring burner for the purpose than to use a solid plate which is notoriously more inefficient. The objections one has seen advanced are hardly illuminating. Is it more irrational to give instructions that the ring is for cooking sauces, stews, soups, and omelettes than to mention that the loose piece of cast iron is for the same purpose? If this instructive qualification is removed from the objection, as to what can one object?

If the ring burner were not supplied, another burner would be in its place; and for the usual type of cooker, replacement stocks would need to be no higher for the one than for the other.

The proposed remedy is interesting, in that it is a reversion to inefficiency and against all the tenets of maintenance. If the maker could cast ⅛-in plates, and supply them, he would make his fortune at the expense of the poor long-suffering gas company. For a ⅛-in. cast-iron plate is "handy about the house"; unless it were very large it would undoubtedly be mislaid when wanted. The cook would use the burner without the plate, and burn her sauce. Then she would condemn the burner, or go to the gas offices and get a new plate. What a lot of replacements would have to be carried in stock! It is the case, too, that the small hotplate idea has been tried in a maker's laboratory, but been abandoned on the score of maintenance and inefficiency. What must be supplied nowadays is something efficient and substantial, with sound robust brasswork, pleasing in appearance, and (above all) with no small loose parts which are easily lost.

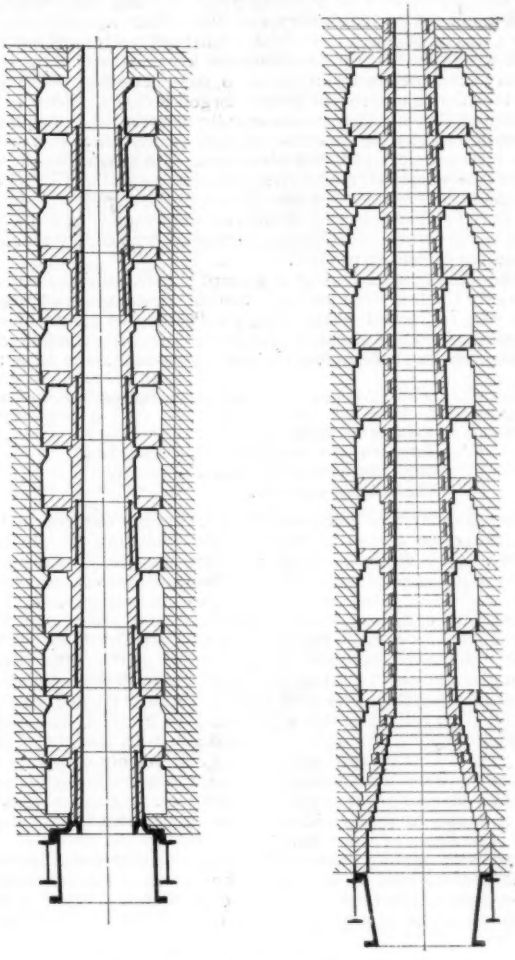
In these days everyone is worried about efficiency. The Continental burner—call it what you will—is an efficient burner. It is also a simple burner. In this case, without adjuncts of cast-iron, efficiency is not purchased at the price of maintenance. And after all, maintenance is an indispensable condition to the gas industry.

GLOVER-WEST VERTICAL RETORTS AT BELFAST.

The Belfast Corporation have placed a contract with West's Gas Improvement Company, Ltd., to reconstruct their No. 1 installation of Glover-West vertical retorts, with eighty retorts in ten settings, on the lines of their new model.

The retorts will be increased in length by the addition of a steaming chamber at the base, as shown in the diagram. In this chamber, which takes the form of an enlargement of the retort section, the steam, introduced for the purpose of water-gas generation in the retort, is raised in temperature, at the expense of the residual heat of the coke, to that necessary for the water-gas reaction.

The reconstruction includes the complete rebuilding of the retort-settings, which have been in constant operation for a period of ten years. They were in any case due to be reset at an early date; but by the adoption of the new principle, the yield of gas in this installation will be increased by 2 millions, and the labour cost per setting, remaining constant, will be correspondingly less per 1000 c.ft. of gas made.



Reconstruction—The Old (left) and New (right) Sections.

The opportunity will be taken to reconstruct the producers on the open step-grate principle with greatly increased area, and specially designed to minimize the formation of clinker and maintain a constant composition of fuel gas in greater quantity for increased requirements of the settings. The top and bottom fittings and gas collecting and foul mains will also be entirely reconstructed. The work has been arranged to be carried out in two sections, so that only half of the retorts will be out of operation at one time.

Mr. S. G. Thornton Andrews, the late Deputy-Chairman and former Engineer, Manager, and Secretary of the Swansea Gas Company, who died at the age of 59, left estate of the gross value of £13,821.

NOTES ON CALORIFIC POWER TESTING.

By H. J. Hailstone, F.C.S. (Rochdale).

One effect of the Gas Regulation Act has been a vastly increased demand for the determination of the calorific value of the various gases produced during the processes of manufacture, and when mixed ready for sending out. The routine work of gas testing has therefore come into greater prominence, and is now a vital feature of all gas-works control. As most gas-works possess several separate installations of gas-making plant, sometimes of similar type, but often of diverse character, a knowledge of the quality of each grade as produced by the various units, and also that of the resulting mixture, is essential in order that the final product may be regulated and controlled, and the desired uniform results obtained.

On most of the larger and well-equipped works the information is always rendered available from the indicators or charts of the various indicating or recording calorimeters, which give immediate notice of the variations in quality of the particular gas supplied to the instrument. Where the output of a works justifies this expenditure, one finds recorders at work during manufacturing operations on each distinct gas-producing plant, as well as on the mixture entering the town mains. In the smaller works, however, the employment of more than one of these delicate instruments is not always customary, and hence their adoption may in many cases be confined to the use of one such instrument working on the town gas. In the case of such a works, where one or more ordinary calorimeters are employed to make periodical determinations in order to control the processes and obtain a regular grade of gas (and this includes almost every gas-works in the country) the possibility of wide variations in final quality grows less as the works tests are obtained, and acted upon, with greater frequency. In all cases where large numbers of routine tests of any kind have to be made, it is usually possible to adopt time-saving and simplifying devices in testing and in working-out results; and the following remarks will be of interest to readers whose duties include this routine calorimetric work.

In the actual determination of calorific value, little can be done to simplify the test itself without affecting the degree of accuracy. When the volume of water collected during the period of one revolution of the test meter, together with the corresponding temperature rise, has been noted, the ensuing calculation is made:

$$\frac{T \times W \times 3{\cdot}968}{V \times F} = \text{B.Th.U. per c.ft. corrected}$$

where W = volume of water in litres.
T = temperature rise in degrees centigrade.
V = capacity of one revolution of meter.
F = the tabular number.

Now this cumbersome calculation may be readily reduced, by the means described below, to a simple multiplication of only two numbers. Or if desired, a graph or table may be drawn up so that the required result may be read-off direct, without recourse to any calculation whatever. For a given calorimeter, "V" is constant (either $\frac{1}{10}$ or $\frac{1}{12}$ c.ft.). The volume of water collected should not vary greatly beyond a comparatively small range, though "T" may fluctuate widely as the gas quality alters. The tabular number "F" may be eliminated from the calculation by so calibrating the meter that it delivers the corrected volume of gas for each test; and this is provided for by fitting the small attachment depicted in fig. 1. To dispense with the use of the factor 3·968 and that represented by "V," it is only necessary to attach to the water measure a fresh scale, graduated in such a way that 39·68 divisions are equal to the 1 litre (when a $\frac{1}{10}$-c.ft. meter is in use) or 47·62 scale divisions to the litre for a $\frac{1}{12}$-c.ft. meter. See fig. 2.

The working-out of a result is then only a matter of multiplying the temperature rise by the figure on the new water-measure scale—a calculation occupying only a few seconds. If it is desired to make use of a table (as shown in Table I.) or a graph, then there is no need to employ a fresh graduation scale on the water measure.

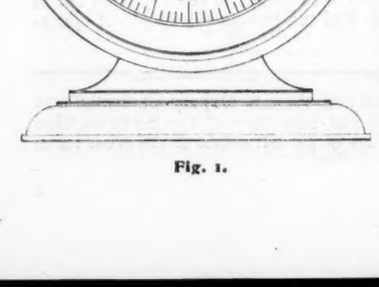


Fig. 1.

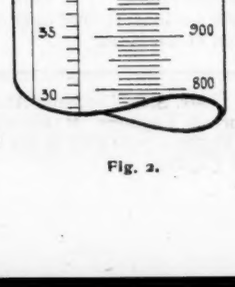


Fig. 2.

Table I.—*Showing Portion of Table for Finding B.Th.U. (to nearest whole number).*

"T"	"W" (New scale readings with $\frac{1}{10}$-c.ft. meter.)				
	47·8	47·9	48·0	48·1	48·2
10·5	502	503	504	505	506
10·6	507	508	509	510	511
10·7	512	513	514	515	516
10·8	517	518	519	520	521
10·9	522	523	524	525	526
11·0	526	527	528	529	530

Reference to fig. 1 will show clearly what is necessary. A small slide with pointer, cut from blackened sheet tin, is shaped to fit on the rim of the meter dial, allowing for adjustment in any position. It is not necessary to deface or modify the meter, as the weight of the slide will always keep it in any position near the top of the dial. On the face of the dial itself is pasted a slip, as shown, which is graduated in the opposite direction, and covers a range wide enough to include all likely values of "F," say from 0·870 to 1·085. The tabular numbers are marked on the slip opposite their reciprocals on the dial graduations.

In carrying-out a calorific test, all the usual conditions and precautions are observed, and the tabular number is noted after observation of the barometer and meter thermometer at the time of the test. The adjustable slide is then set to the corresponding position on the scale, and when the meter hand passes the zero point the water is switched into the empty glass measuring vessel and allowed to deliver until the meter hand reaches the adjusted pointer—*i.e.*, approximately one revolution. This will represent the passage of a volume of gas equal to the corrected meter capacity for one revolution at 60° Fahr. and 30 in. pressure. Thus for a $\frac{1}{10}$-c.ft. meter at 58° Fahr. and 29·2 in. barometer, the tabular number is 978, and with the pointer set accordingly it will be seen to be equivalent to 1·022 revolutions of the meter, and this volume is exactly equal to $\frac{1}{10}$-c.ft. at N.T.P. The same principle is involved in the case of a $\frac{1}{12}$-c.ft. meter; and should it be preferred to collect the water during more than one revolution, this can be arranged by using a slip graduated on twice or thrice the scale, and similarly with regard to the water vessel graduations.

Example: Barometer, 29·2 in. Meter temperature, 58° Fahr. Meter capacity, $\frac{1}{10}$ c.ft. Tabular number 978, and pointer set accordingly. Temperature rise of 10·80° C. and water collected 1210 c.cs. (scale reading of 48·01). B.Th.U. per cubic foot corrected, 10·80 × 48·01—*i.e.*, 518·5 read off from table or graph.

This little device has been found of great convenience, has considerably facilitated and quickened-up work where numerous works-control tests are required daily, and after a little practice may be used by non-technically trained staffs.

THE ELECTRICAL PRODUCTION OF WATER GAS.

The possibility of applying surplus hydro-electric power to the carbonization of coal has been discussed from time to time. An account was given in the "Journal" (Nov., 1920, p. 268) of the experiments in this connection of Mr. J. Mogford, the Gas Engineer at Briton Ferry. Mr. Mogford proposed to overcome the heat losses due to the low conductivity of the refractory materials employed in the manufacture of retorts, and the slow heat transmission in the coal substance itself, by maintaining the heat necessary for distillation by means of an electric arc. The scheme was submitted to the Inventions Department of the Ministry of Munitions, who did not regard it altogether favourably. Since then we have heard nothing of this suggested plant.

The gasification of fuels is not generally regarded as a process suited to the application of electricity; but where fuel is dear and a surplus hydro-electric load exists, the operation may be economical. The February issue of our contemporary, the "Beama" Journal, states that *Electrotechnik und Maschinenbau* describes several types of plant coming into operation on the Continent for the manufacture of water gas by the passage of steam over electrically heated coke. The process has the advantage of being continuous, whereas ordinary water-gas production is intermittent. The coke in these furnaces is heated to redness by resistance between electrodes. The latter may be vertical, when the hearth of the furnace acts as a conducting electrode, or the electrodes may be horizontally disposed along the lateral walls of the furnace. An interesting variation is the Holmgreen process for the gasification of peat bearing 50 p.ct. of water. A bed of coke is first heated to redness, and covered by a layer of peat. The heat evaporates the water of the peat, and proceeds to decompose the latter into combustible gases. These gases and the water vapour are then led back through the bed of the furnace and the red-hot coke; so decomposing them with the formation of rich water gas. As the coke-bed burns, it is replaced by the peat coke which remains in the furnace after the volatile gases have left the peat. This process is said to be successful for the gasification of inferior fuels not only of the peat type (with which it is notoriously difficult to deal), but also of the bituminous type.

SOUTHERN ASSOCIATION OF GAS ENGINEERS AND MANAGERS.

A General Meeting of the Association was held last Thursday in the Connaught Rooms, Great Queen Street, W.C., to receive the annual reports of the Committees, to elect new members, and for the induction, as President, of Mr. PERCY S. HOYTE, of Plymouth. The chair at luncheon, which preceded the business meeting, was taken by the President-Elect, who was supported by Mr. J. M. CAMPBELL, of Margate, who on Thursday brought to a close a highly successful year of office. Mr. J. H. ELLIS (Chairman of the Plymouth and Stonehouse Gas Light and Coke Company) was the guest of honour; and near the President were Mr. F. C. O. Speyer (British Sulphate of Ammonia Federation); and Mr. D. Cleave Cross (Lea Bridge), an *ex-officio* member from the London and Southern District Junior Gas Association. Among those present were many distinguished Past-Presidents of the Association; and the Institution was represented by the Secretary, Mr. Walter T. Dunn.

THE LUNCHEON.

After the Loyal Toast had been given by the President-Elect, Mr. T. W. Speyer rose to propose the toast of the Southern Association. It was, he said, with fear and trembling that he undertook the duty, and he wondered on what grounds he had been selected to propose this toast—perhaps it was that the last shall be first. In any case, it was a great honour. He referred to the mistake in evidence on the luncheon menu—namely, the addition of "Ltd." after the Association's title. His first thought was that the Association had gone the way of some of the big banks, by lopping off some of their least useful partners; and second thoughts were that the Association had become a limited company. He was assured, however, that the Association's freedom had been retained, and he was glad that it had not become limited. He personally had always been struck by the extraordinary number of tasks performed by gas engineers, and he was full of admiration for the manner in which they were carried out. With the toast he coupled the name of Mr. Hoyte, the President-Elect.

Mr. P. S. HOYTE, rising to respond, voiced his appreciation of the toast and the inclusion of his name. In his opinion, there never was a time when gas engineers "had their tails up" as much as to-day, for they had just successfully weathered the most virulent and sustained attack. Perhaps such an attack was a good thing, for it kept them alive and wondering whence would come the next one, so that they might be even more ready to meet it than before. The therm controversy had been settled in the way they all knew was inevitable; and he considered the most striking thing was not so much the evidence of their fellow gas men, but the great mass of outside support of the therm system. The industry was now free to go ahead, for the therm had not only been vindicated, but its extension recommended. As for the Southern Association, their membership was now 284—greater than that of any other kindred body; and he would feel extremely gratified if, before the close of his year of office, they could reach a round 300.

Mr. L. J. LANGFORD (Tunbridge Wells) next gave "The Visitors." Though the word limited might appear on the menu, nevertheless he could assure those present that the Association were unlimited in extending a very hearty welcome to the visitors. Among the many distinguished gentlemen present, he mentioned especially Mr. J. H. Ellis, Chairman of the Plymouth and Stonehouse Gas Light and Coke Company, of whom it had been said that "no man was the more capable of managing a meeting."

Mr. J. H. ELLIS, responding, said he had to express the great regret of his fellow directors at being unable to attend the meeting; but he would remind the members that two of his colleagues were over eighty, and the other four were active business men. Nevertheless, he was sorry the whole Board could not attend to show their appreciation, as was the case last year at Margate. Personally, he had enjoyed much hospitality from gas engineers, and hospitality that was always enjoyed, for he had yet to meet a gas engineer who was not a jolly good fellow. On behalf of the Board of his Company, he had to extend to the Association a cordial invitation to visit Plymouth. Apart from the works, there were many places of interest to be seen; and he hoped those who came would make a long week-end stay, for the quiet chat after the meeting undoubtedly tended to that cordial co-operation which had placed the gas industry where it was to-day, and which taught them that difficulties were only made to be got over. The date of the visit was to be May 25.

THE BUSINESS MEETING.

An adjournment was then made to another room, where the business meeting was held. Mr. J. M. CAMPBELL, of Margate (the outgoing President), occupied the chair during the earlier part of the proceedings.

CONFIRMATION OF MINUTES.

On the proposition of Mr. CAMPBELL, it was agreed to take as read the minutes of the last meeting, as appearing in the "JOURNAL;" and they were confirmed.

ANNUAL REPORT.

Mr. CAMPBELL said the annual report had been circulated among the members; and he did not think there was much in it for comment. It was an exhaustive account of the year's happenings. The outstanding feature was that they had had one or two extra meetings. The general meeting arranged at Exeter was welcomed very much by the Western members. Then there was the visit to the Davis Gas-Stove Company's works (which was quite a new feature), and also the inspection of the Luton Gas-Works. The extended membership was a matter for congratulation. Though the year's working had resulted in a small deficit of £3, the position was quite satisfactory. It had to be remembered that there had been the additional meetings to which he had referred. At the end of the year the Association had total funds amounting to £28, so that they were well on the right side. He moved that the report be adopted.

Mr. C. VALON BENNETT (Rochester) seconded this, and it was agreed to.

The report included the following items:

The General Committee, in presenting their report for the year 1922, have again the gratification of announcing that they can look back upon a period of general and technical progress.

A considerable number of additional gas undertakings have, since last year, commenced working under the Gas Regulation Act, and as a consequence continued interest is being taken in the problems which have arisen as a result of this change. This is reflected in the papers which have been submitted to the members during the year.

The Committee deeply regret having to record the death of the following members: Mr. John West, of Southport; and Mr. F. Turner, of Bromsgrove.

The names of three members were removed from the list under Rule 3, owing to their subscriptions being in arrear. On the other hand, the new members elected leave a total of 284 members, as compared with 266 at the end of 1921.

The receipts during the year were £302 16s. 11d., while the expenditure amounted to £305 19s. 9½d.—showing the small debit balance of £3 2s. 10½d. It should be borne in mind, however, that an additional general meeting was held and a visit arranged to the works of the Davis Gas-Stove Company, Ltd., and the gas-works at Luton. The total funds of the Association on Dec. 31 were £28 5s. 8½d.

THIRD ANNUAL REPORT OF THE COMMITTEE OF THE EASTERN DISTRICT.

Interest in the meetings has been well maintained throughout the past year, the average attendances being 36, as compared with 32 recorded in the previous report.

The date of the May meeting falling near to the visit to Margate, advantage was taken to hold it in that town on the previous day. Many members were present, and afterwards were kindly entertained to tea by the President and Mrs. Campbell.

The discussions on commercial subjects—comprising coke, tar, sulphate of ammonia, and spent oxide—have proved of exceptional interest and, it is hoped, of mutual benefit to the members generally in maintaining the level of prices. Coal contracts have also been reviewed from time to time, and other valuable data obtained.

The debates on technical subjects, including gas-works apparatus, have been continued with great interest; and the number of verbatim reports issued each month has reached the satisfactory total of 118. The topics dealt with have included the new meter for consumers; how to get over the peak load on Sundays; coal testing plant; and charging and discharging machines for horizontal retorts. A number of questions have been submitted through the "Question-Box," and much useful information given.

The following District Officers were elected to serve during the coming year:

Chairman.—Mr. C. H. Rutter.
Vice-Chairman.—Mr. A. H. Andrews.
Committee.—Messrs. C. F. Botley, C. Chambers, A. G. Cheal, J. Fisher, H. C. Head, L. J. Langford, F. Livesey, P. G. G. Moon, W. E. Price, F. Smallbone, and J. Thorman.
Representative Members of the Eastern District to serve on General Committee.—Messrs. C. Chambers and A. G. Cheal in place of Messrs. G. M. Gill and C. H. Rutter, retiring by rotation.
Hon. Secretary.—Mr. L. Trewby.

The total membership of the Section is 229, of whom 110 are representative members and 119 ordinary members.

CHARLES CHAMBERS,
Chairman.

THIRD ANNUAL REPORT OF THE COMMITTEE OF THE WESTERN DISTRICT.

During the year eight meetings have been held—seven at Exeter, and one at Plymouth. The attendance throughout the year has been satisfactory. An average of sixteen members attended the meetings.

Matters of interest have been discussed, such as markets (which include coal, coke, tar, sulphate of ammonia, sulphuric acid, and spent oxide). In the case of sulphuric acid and spent oxide, it has long been felt that these have not been purchased and sold on the most advan-

tageous terms; and the Committee are pleased to record that arrangements have now been completed whereby the acid makers have agreed to take the whole of the spent oxide made in the district and burn it for making sulphuric acid. The agreements entered into by the various undertakings are such that the prices of both sulphuric acid and spent oxide are regulated by the current price of pyrites. It is felt generally that, although negotiations have been somewhat prolonged, the terms of the contract are satisfactory to both parties.

The technical discussions, which were introduced during the previous year, have not been so well supported; but it is hoped that, as other matters do not claim special attention, technical subjects will again be discussed.

The following members were elected as District Officers to serve during the coming year:

Chairman.—Mr. S. E. Halliwell.
Vice-Chairman.—Mr. Jas. Taylor.
Committee.—Messrs. Jas. Armstrong, J. H. Cornish, C. G. Dawson, J. Harger Pye, H. E. Riley, R. Robertson, W. P. Tervet, E. P. Vince, and J. Wesley Whimster.
Hon. Secretary.—Mr. W. E. Dean.
Representative Member on the General Committee.—Mr. W. N. Westlake in succession to Mr. James Taylor, retiring by rotation.

Reviewing the work of the year now past, it still can be said that the meetings are appreciated, and this year has been quite as successful as its predecessors.

P. S. HOYTE,
Chairman.

NEW MEMBERS.

The following four new members were elected, on the proposition of Mr. CAMPBELL, seconded by Mr. P. S. HOYTE:

Mr. Ambrose Barrett, of Frome; Mr. Austin Furneaux Miller, of Brixham; Mr. Ernest Lewis Nicholas, of Guildford; and Mr. George Robinson, of Pinner.

REPRESENTATIVE ON THE COUNCIL OF THE INSTITUTION.

Mr. CAMPBELL said that it had been customary in the past to nominate the incoming President as the representative of the Association on the Council of the Institution of Gas Engineers; but on this occasion Mr. Hoyte was fortunately already on the Council. Consequently they were obliged to elect someone else. The view of the Committee was that Mr. Leonard J. Langford (of Tunbridge Wells), the incoming Vice-President, should be elected as their representative for the ensuing year; and he proposed this.

Mr. D. T. LIVESEY (East Grinstead) seconded the motion, which was unanimously passed.

THE NEW PRESIDENT.

Mr. CAMPBELL said they had now come to the parting of the ways, the next item being the induction of the new President. He himself had had a very successful year of office, and hoped he had acted up to the expectations of the members. ["Hear, hear."] Certainly he had done his very best to carry out the duties of the office to the satisfaction of the members. Now he had to hand over the office to his very worthy successor. In Mr. Hoyte they had a man who possessed marked and special professional ability. He had a strong personality, and was exceedingly popular in his own district and among all colleagues in the industry who knew him. There was no doubt whatever that he would make one of the best Presidents the Association had ever had; and in handing over the office to him, the prestige and reputation of the Association would be in every way enhanced. They would all look forward with great expectation to the visit to Plymouth in May, when they would see something to interest them all, for Mr. Hoyte's works were replete with up-to-date things—some of them peculiar to Plymouth. He now asked Mr. Hoyte to take the chair.

Mr. PERCY S. HOYTE (Plymouth), who was received with applause, then took up the position of President, and thanked Mr. Campbell for his kind words, and the members for his cordial welcome. If, he said, when his turn came next year to hand over the office to his successor, he could leave it with the feeling of satisfaction which he was sure Mr. Campbell had, he would be more than repaid for any trouble or anxiety he might experience during his term as President. The presidency of their Association was a very great honour, and Mr. Campbell was going to be an exceedingly difficult man to follow. He had, without any exaggeration, endeared himself to every one of them. ["Hear, hear."] His year of office had been marked by some extremely valuable papers and discussions, one of which they would all bear in mind—that contributed by Mr. Carmichael. This was one of the most valuable papers ever put before a District Association, or even the Institution. He (Mr. Hoyte) had been told that the most difficult part of the President's work was to secure papers for meetings; and he asked them all to back him up in the same way that they had backed up Mr. Campbell. He proposed a very hearty vote of thanks to their friend for the way in which he had conducted the business of the Association during the past year.

Mr. J. WESLEY WHIMSTER (Bath) seconded the proposition, declaring that they could not have had a better or more popular President.

The vote having been carried by acclamation,

Mr. CAMPBELL expressed his thanks, and acknowledged the loyal support he had received on all hands, which had carried him through. He said he was particularly indebted to Mr. Bennett, their Hon. Secretary, for the great assistance he had rendered, while unhappily not in the best of health. The Committee had also helped tremendously.

Mr. HOYTE then proceeded to deliver the following

PRESIDENTIAL ADDRESS.

A mere Southron, if he were of a fearful heart, might stagger in this attempt; and gazing down at what appears to be the almost uninterrupted line of illustrious Scotsmen who for years past have graced this presidential chair, he might well be excused if his feelings were somewhat akin to those of a super who, without a vestige of the national garb, finds the curtain rising on his inadvertent inclusion in that majestic procession of Banquo's kilted kings.

However that may be, it is a company in which I am proud to be numbered, and my first duty is to tender you my most sincere thanks for the honour you have bestowed by placing me in the line of Presidents of our Association—those past and those to come—not on my own account, but rather on that of the undertaking and the town I have served with such pleasure for all but thirty years, and of all the friends I have been fortunate enough to make during that period in our fair West Country. It is, as you are aware, a district in which large works are few and far between; but, though most of us carry on our operations on such a relatively small scale, we have shared to the uttermost in the trials which have during recent years beset the great industry with which we are associated.

So much valuable work is now being carried out by the various committees of our central Institution, having funds and talent at their disposal which can rarely be commanded by an individual undertaking, and so much ground is being covered that, even with the many problems pressing for solution, it is not really so strange that a President should find himself somewhat "gravelled for lack of matter"—at least, really fresh and valuable matter—for his address. It is, however, an admirable precedent, and one from which I have no intention of departing, that the occupant of this chair should give some description of the undertaking for which he is responsible. And why not? If his service has been a long one, it is largely the child of his brain; he is at the centre of its activities, of its own special problems which may to-morrow be those of the colleagues whom he is addressing, and no one of us, I am sure, ever visits a fellow engineer's works without seeing something that he may with advantage and due acknowledgment imitate, or something—though, of course, on only the rarest occasions—that he should avoid.

I do not propose to weary you with details of features that are common to all our works, but will say briefly that our annual output is in the neighbourhood of 1600 millions—if one may be permitted, at this time of day, to employ the old-fashioned volumetric standard—and that in common with most, if not all, South Coast towns, we are largely residential. It may be our soft West Country climate that disinclines our consumers to the physical exercise entailed in the preparing, stoking, and cleaning-up of solid-fuel stoves, be they of coal or coke, for they show a strong preference for gas for all purposes in their homes. The coke market is therefore a restricted one, and for the past quarter of a century it has been our policy to make a substantial proportion of carburetted water gas.

The weekly percentages of this gas sent out during that fateful three months of the 1921 coal strike may be of interest to you. Thanks to an excellent stock of coke, our 40,000 consumers were able to cook their dinners and light their homes during the period when there was not a shovelful of coal to be had in the Port:

April 8	73·40 p.ct.	June 3	75·52 p.ct.
,, 15	85·49 ,,	,, 10	76·68 ,,
,, 22	91·76 ,,	,, 17	87·42 ,,
,, 29	100·00 ,,	,, 24	79·86 ,,
May 6	100·00 ,,	July 1	77·54 ,,
,, 13	100·00 ,,		
,, 20	98·68 ,,	Average for the quarter	86·48 ,,
,, 27	76·04 ,,		

I commend these figures to the attention of those professors and pressmen who seem to suffer periodically from carbon monoxide afflatus.

The works of the Plymouth Gas Company, though situated so far from the coalfields, are admirably equipped for taking-in their raw materials, coal and oil. A wharf with accommodation for steamers up to 2500 tons is close to the works, and the coal is discharged by the Company's own cranes direct into their steam wagons, which, after a run of only 500 yards, deliver it into the breaker and elevator of the large coal store or any other part of the works, as may be desired. The whole cost of delivery from ship to store, including capital and maintenance charges, does not exceed 14d. per ton.

I may say at this point that at the head of the coal-store elevator is a device for automatically and continuously sampling each cargo of coal as delivered. I do not think it is possible to over-estimate the importance of the really meticulous sampling of the whole of the materials in which we deal, as the most elaborate analyses are so much time and money thrown away unless they are made on portions that are absolutely representative of the bulk.

Oil is delivered direct into the Company's tanks, which have a capacity of over 5000 tons, through a line of about 1100 yards of 6 in. steel pipe running direct from the deep-water wharves on the Cattewater.

A railway siding, with accommodation for about twenty-six trucks, has recently been completed; and this, with its 5-ton crane,

not only gives us an alternative to sea-borne coal, but is also in daily use for the discharge of various works material and the loading of coke, which I need hardly say we are careful to avoid sending into our neighbours' districts unless by special request. Would that I could say the same of them!

MANUFACTURING PLANT.

The coal-gas plant consists of a horizontal retort house—twenty-two settings of nine retorts each, erected in 1894, and now over-ripe for remodelling. Its maximum capacity is about three million cubic feet per day, and it is worked by Fiddes-Aldridge stoking machines. There is also a stand-by house of inclined

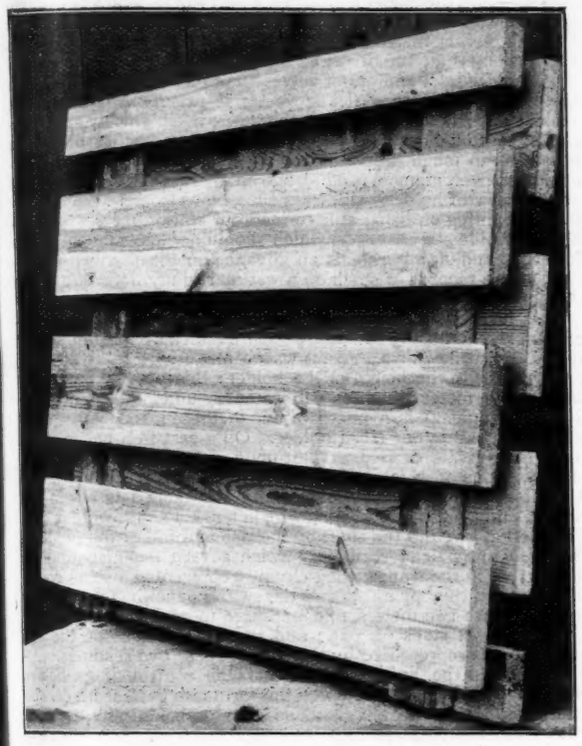


FIG. 1.

retorts, installed in 1903, capable of producing about one million cubic feet per day.

The carburetted water-gas plant contains four sets each of about one and a quarter million cubic feet per day capacity, and we hope shortly to bring this thoroughly up-to-date by the addition of waste-heat boilers and automatic controls.

COKE-HANDLING PLANT.

The coke from the retorts is dealt with by a very complete installation of telphers, which not only deliver the coke into storage bins for ultimate sale, but also to the overhead hoppers feeding the carburetted water-gas generators. Extensions are provided, you will note from the plan, for delivering breeze from the screens under the coke bins, from the telpher tanks, and coke from the pan-ash plant to the power house, carburetted water-gas, and residual boilers. Ash from the pans of the retort-house furnaces and carburetted water-gas generators is shovelled direct into skips, whence it is hoisted and conveyed to the hopper of the "Columbus" washer, which lies directly under the telpher track between the coal-gas and carburetted water-gas plants. This very ingenious device, as you are no doubt aware, effects a practically complete separation of coke from clinker by suspension in a clay slurry of about 1·25 sp. gr.—the coke floating on the top, and the heavier clinker falling to the bottom. It has been placed some feet above ground level so that the screenings, as well as the separated coke and clinker, fall into separate skips, the coke being hoisted and taken direct to the boilers, and the screenings and clinker to hoppers, where, without further handling, they discharge into our steam wagons for sale or conveyance to the tip.

In this connection I may say that my Company three years ago purchased an old quarry of some six acres in extent, about a mile and a half from the works, as a tip for ashes and rubble. The

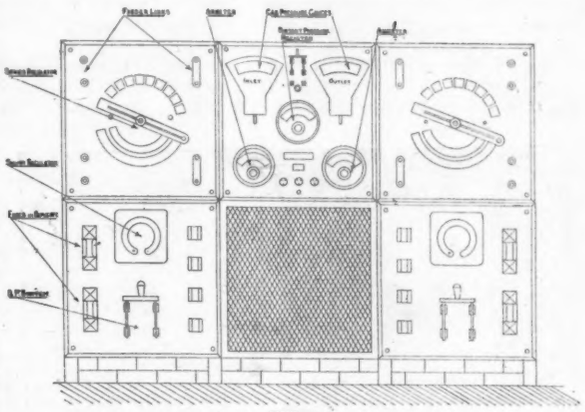


FIG. 3.

site, as it is filled-in, is being developed for building purposes; and since its acquisition a large proportion of our clinker commands a ready sale where formerly we had either to beg or buy permission to deposit it.

The rest of our manufacturing plant up to the station meters calls for little comment. We are now installing two catch purifiers, each 40 ft. by 30 ft., for coal and carburetted water gas respectively, and we anticipate from their use a substantial reduction in purifying costs. In this connection, the type of grid (see fig. 1) we have for some time been using may be of interest. I believe it is common in the States, and is not only effective but uncommonly cheap and simple to construct, and costs next to nothing for repairs.

METER, GOVERNOR, AND BOOSTER HOUSE.

Hitherto our station meters, governors, and boosters have suffered, if I may so put it, from an extreme form of individualism. The three station meters—two for coal gas and one for carburetted water-gas—have each occupied widely separated sites on our works. Of our five governors, only two were sociable enough to carry on their operations under the same roof, while the

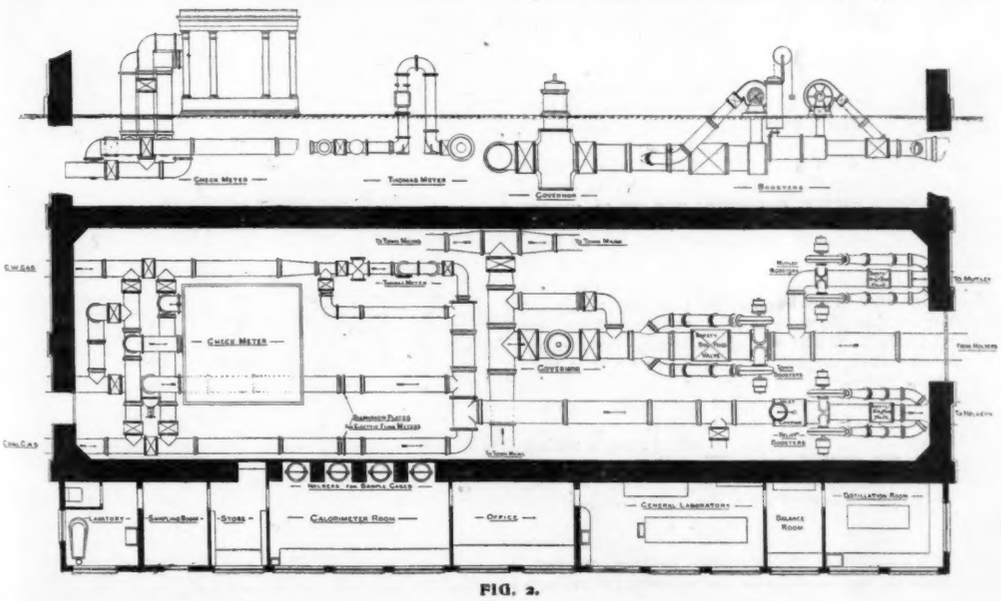


FIG. 2.

boosters have been housed in a small shed, the site of which will soon, I trust, know them no more. The rearrangement of our Distribution Department, which I hope to describe later, placed at our disposal a building occupying a central position on the works, in which are now being accommodated the whole of our station meters, boosters, and governors—in fact, everything that is necessary for the efficient recording of make and output, and for the maintenance of adequate pressures in our district.

For a somewhat congested works the old-fashioned, but none the less extremely reliable, wet meter occupies far too much ground space, apart from its excessive cost, and it was impossible on the site to find room for three of these monsters. For the past two years, all our make of carburetted water gas has been recorded by a Thomas meter. We have had no means of checking this; but a glance at the plan (fig. 2) will show how we propose to overcome this difficulty. The Thomas meter is being removed to the new house. An electric flow-meter, such as was described by Mr. Terrace in his interesting paper last year, will record the coal gas, and our largest wet station meter is also being removed and the mains so arranged that it may be placed in series with either of the electric meters. This we propose to do, and so arrive at a proper correction factor, if such is needed, for the meter that is temporarily running alone. This arrangement, while it has economized both ground space and cost, will, I believe, give us a really accurate record of our make.

Between the outlet of the station meters and the inlet to holders, you will note that boosters in duplicate have been provided, which will relieve the back-pressure of the holders on the purifiers and

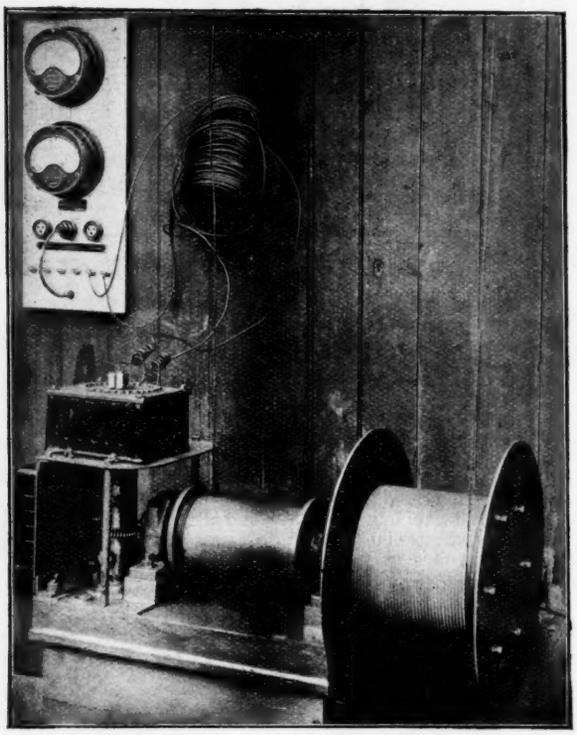


FIG. 4.

the remainder of the plant. It is a general experience that more purifiers are changed on account of back-pressure than by fouling; and coupled with the relief afforded to the other apparatus, these boosters will, I think, prove well worth the outlay.

From the holders, the gas returns to the meter house through a 42-in. feeder, and is delivered to the district by two sets of Keith-Blackman boosters, each in duplicate; one set of 400,000 c.ft. per hour capacity, with a differential of 30 in., supplying our Mutley area to the north, and the other of 750,000 c.ft. per hour, with a differential of 14 in., supplying our main district in the town. The diagram of the switchboard panels (fig. 3) for these boosters may be of interest to you, as they are constructed almost entirely by our own staff at the works; and may I say here that the point of view of the man who merely sells apparatus often varies so widely from that of the man who has to live with it, that it is, at least in many cases, far more satisfactory, and in the long run cheaper, to build one's own. The illustration shows a switch-board for the control of one pair of boosters; an unusual feature lying in the association of all gas-pressure gauges within the same mount in as the control gear. Thus the centre panel is equipped with two booster-motor ammeters, a common inlet and outlet pressure gauge, together with the Widlake distance pressure-indicator, which I had the pleasure of describing to you some time ago, and the advantages of which I am glad to think are now realized by a number of undertakings besides our own. This disposition ensures that the operator can observe the results of his switch-gear manipulation without the necessity of even taking his hands off the controls. It will be seen that with this arrangement it is impossible for an operator to make a mistake by manipulating the wrong control gear, or referring to wrong instruments for information. Such errors are quite possible if pressure adjustments necessitate a journey from a line of control-boards to a line of pressure gauges. The links shown enable the current supply to be taken from either of two separate feeder lines, and also can be used as isolators for testing or repairs, while duplicate fuse fittings permit of the replacement of a hot fuse during a run without any interruption—an extremely important matter for which provision appears to be rarely made.

Two other items, due largely to Mr. Widlake's untiring inventiveness—one, the holder indicators, which will show at any distance the height of our holders in feet and inches, from which the stock in cubic feet, or therms, may easily be arrived at by means of a conversion table; the other, an apparatus for the remote control of gasholder inlet and outlet valves. As regards the former, with the ever-increasing peak-loads we are all experiencing, it is of the utmost importance that stocks should be taken quickly and accurately, so that hourly output may be determined as closely as possible—so much depends upon it—and a device that will indicate at a given moment, and at one spot, the stocks in practically any number of holders will, I am sure, be welcome. We are certainly counting on being able to read our station meters and gasholders inside sixty seconds, which should not leave much margin for error, and, at any rate, is an advance on the man with a lantern, whose records of stock on a wet and windy night show such curious variations in hourly output.

This instrument, so far as its principles of working are concerned, resembles the distance pressure indicator inasmuch as it regulates the flow of a current whose magnitude is at all times proportional to the height of the holder; this current being indicated on a meter which is calibrated in units of height. The illustration (fig. 4) is a photo of one of these instruments about to be installed on our No. 1 holder. On a cast-iron baseplate, in roller bearings, is carried a shaft upon which is mounted a pair of drums, one of which is driven from a top-lift guide-bracket by a flexible steel line. The other drum is attached to a counter-weight, and keeps the operating wire in tension as the holder falls. The motion given to the shaft by the rise and fall of the holder is imparted to a pair of regulators which govern the magnitude of the current in the transmitting circuit (represented by the coil of wire between the apparatus and the switch panel). This panel is equipped with two meters, one reading 0 to 36 in., and the other 0 to 108 ft. in steps of 3 ft.; and the exact height of the distant holder is represented by the sum of these two readings.

As regards the apparatus for distance control of gasholder valves, those of you who are not the fortunate possessors of, and who have looked with envy on one of those beautifully designed valve houses, such as we have seen at Tottenham and elsewhere, will, I hope, be interested in our makeshift. Owing to the congested state of the works mains, such an arrangement was for us quite unattainable, and at any rate could not be provided for in the new house as we should have wished. Necessity has ever been the mother of invention, and we hope to have the valve of our largest holder operated within the next few weeks from the new house. The motors which will revolve the valve spindles were used, or at least designed, in their previous incarnation, for working ammunition hoists in H.M. Navy, and will henceforth serve a more peaceful purpose.

This sketch (fig. 5) shows the method by which the spindles of the existing holder valves will be associated with the driving motors. These machines have embodied in their construction a worm reduction gear which gives their hoist shafts a speed of

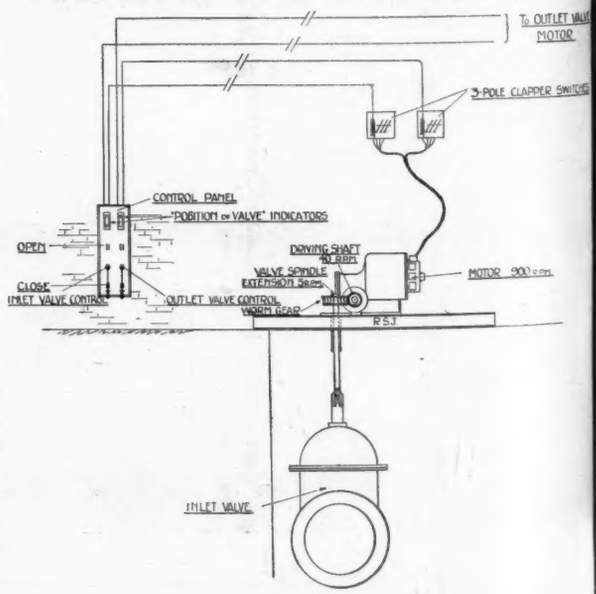


FIG. 5.

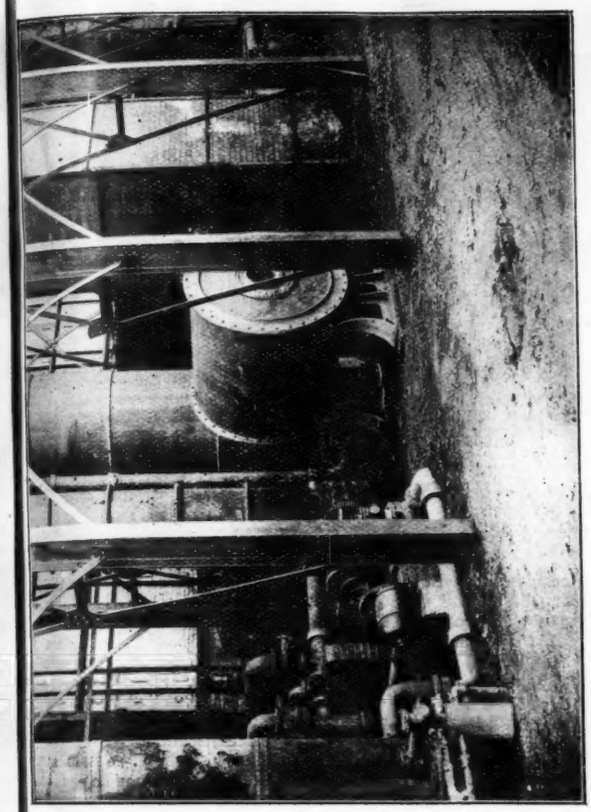


FIG. 7.

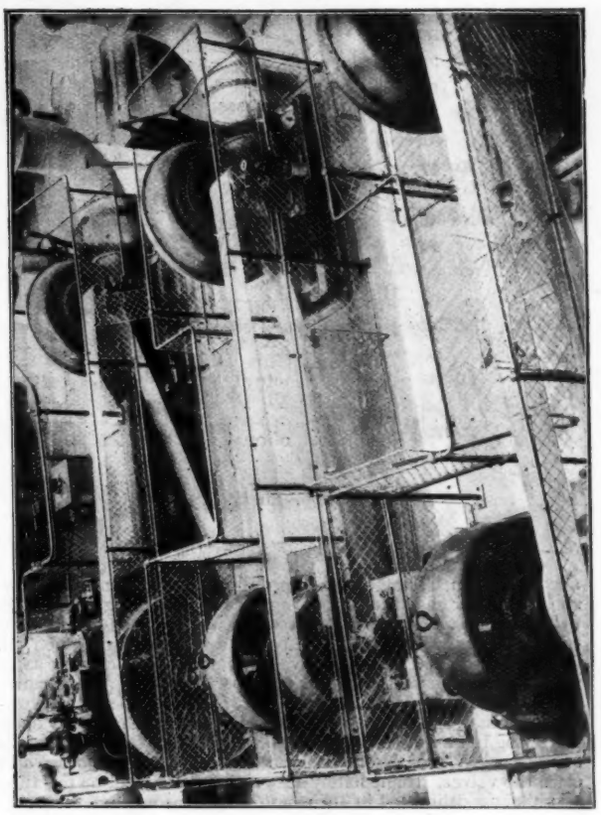


FIG. 10.

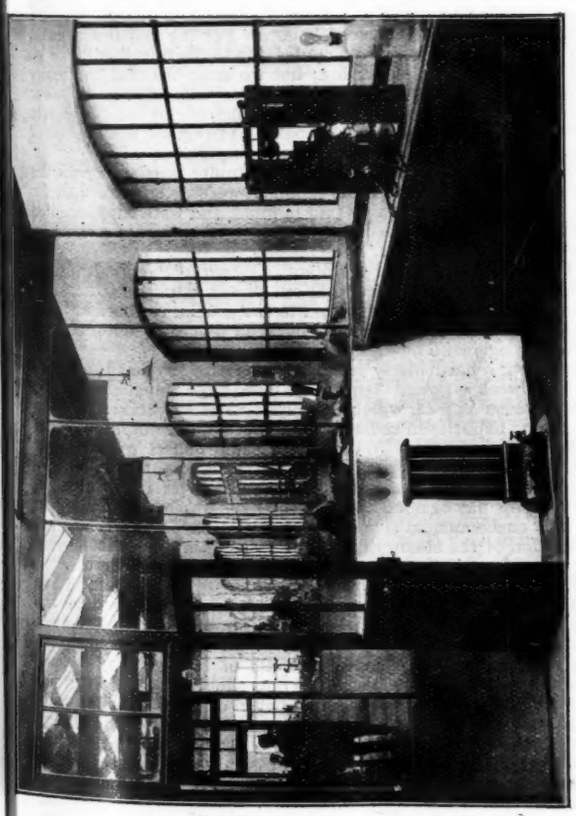


FIG. 6.

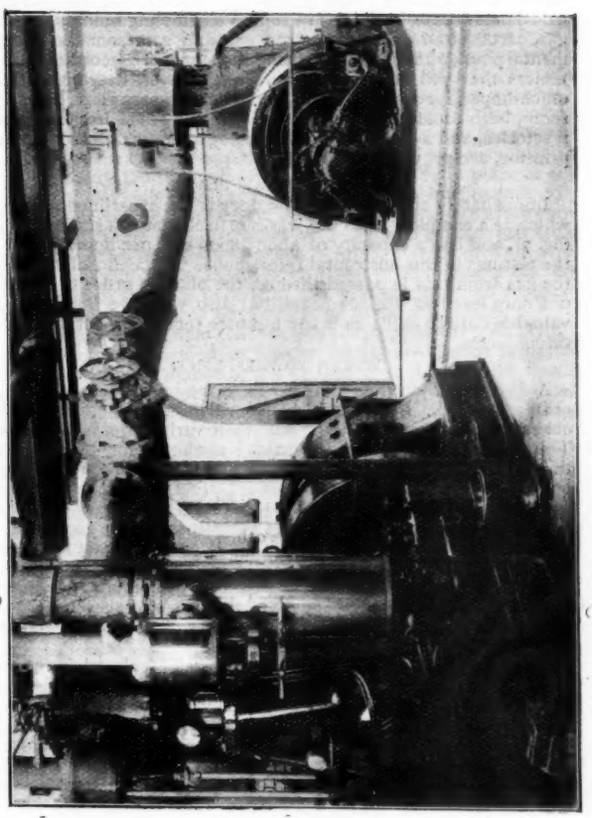


FIG. 8.

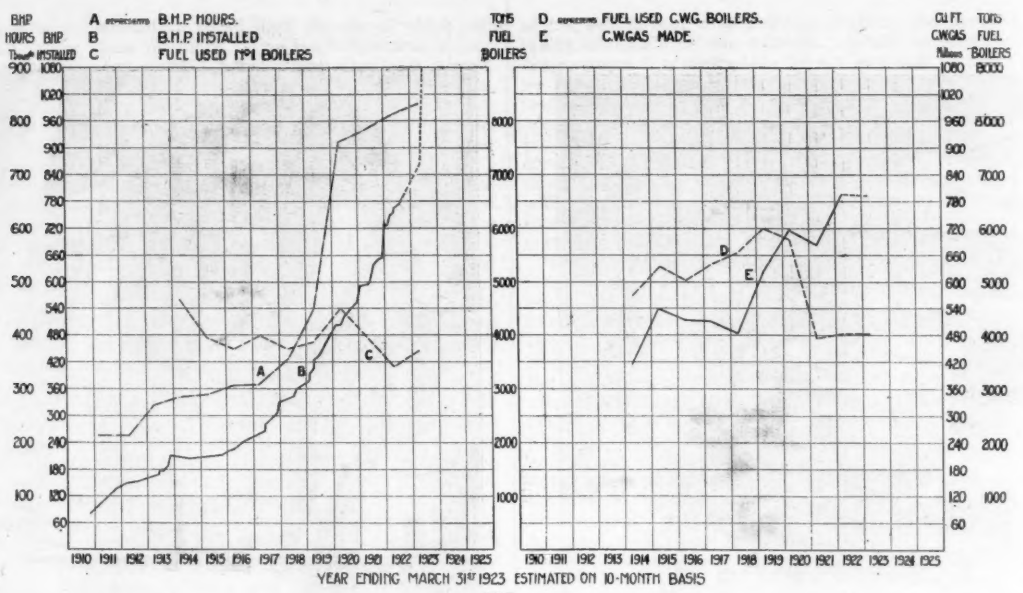


FIG. 9.

about 40 r.p.m. The hoist drums will be removed, and this slow-speed shaft extended to just beyond the vertical centre-line of the valve spindles. At this point a worm will be fitted to the shaft to gear with a worm wheel keyed on to a vertical shaft which will fit over the squared ends of the valve spindles in exactly the same way as does the present T-headed operating key. The control panel for each holder will consist of a pair of single-pole throw-over switches, one for the inlet and the other for the outlet valves. Throwing these switches to the top position will cause the valves to open, while the bottom position will reverse the motors and close the valves. Immediately above each switch will be installed an indicator calibrated in turns and half-turns so that the operator will be able to see at a glance the exact opening of any valve and the variations in that opening in response to his manipulation of the control gear.

LABORATORY.

This adjoins the meter and booster house, running along its whole length for some 120 ft., and, as you will see by the illustration (fig. 6), is divided by glazed partitions and doors into distillation room, balance room, general laboratory, and analysis and calorimeter room, in which are separate sampling holders for coal gas, carburetted water gas, mixed gas, and gas from the experimental plant, with ample accommodation for those recording calorimeters that will never tell a lie, when, if ever, they make their much-hoped-for appearance. Then the laboratory store, sampling room, bath room, and lavatory. A furnace room for testing refractories, and a dark room for photography and drawing-office printing, are provided elsewhere.

EXPERIMENTAL PLANT.

Immediately opposite the laboratory is the experimental plant, which is a complete little gas-works in itself up to its station meter (fig. 7), and has a capacity of about 8000 c.ft. per hour. One of the settings in the horizontal retort-house has been isolated, and the gas from this is passed through the plant in order to provide not only tests on various coals, but also what we hope will be valuable data to guide us in the ultimate remodelling of the whole retort-house.

WORKS POWER-PLANT.

A feature which I venture to hope may prove of more than ordinary interest is the extensive use which my Company make of electrical power in connection with their various works processes. The time has long passed for making apologies for such a practice. On most undertakings of any size, a certain accumulation of coke breeze is inseparable from the process of coke-handling, and such works have the first and most important essential for a supply of electricity, which, I submit, should be regarded as a cheap and valuable residual. In most cases the first introduction of electrical power within a gas undertaking is due to the acquisition of some form of electrically operated stoking machinery, and it is from such beginnings that larger issues spring, as, for example, the plant which I have the privilege of describing to you.

In 1910, just prior to the introductory use of electricity at our works, the power requirements of the works were supplied by three batteries of 30 ft. by 8 ft. Lancashire boilers. One battery of three boilers, situated adjacent to our No. 1 retort-house, supplied steam to an air-compressor for the operation of West's machines, and to six steam-engines and two pumps situated within or near the retort-house. At that period it is estimated that the total load supplied by these boilers was round about 120 B.H.P., while the yearly power output was probably in the neighbourhood of 200,000 B.H.P.-hours. The second battery of three boilers was situated within our carburetted water-gas plant, and besides supplying steam to the generators, was used for the working of all the steam-driven auxiliaries, such as blast-fans, exhauster, and boiler-feed and oil pumps. In addition to the requirements of the carburetted water-gas plant itself these boilers also supplied steam to three engines in the blacksmiths' and fitting shops, to a Kirkham washer, scrubber pumps, gas-compressors, and a small turbine-driven boosting fan. The third battery of two boilers supplied steam to our sulphate of ammonia and cyanide plants, both for the chemical processes and for the operation of the pumps and agitators associated with them. It will be noted that the No. 1 house and carburetted water-gas batteries handled our former power load, and the supply was given through an arterial system of steam-pipes, in some cases running as far as 460 ft. from the boilers. Condensation losses were undoubtedly very heavy, and two of the three boilers in each battery had to be worked continuously at their maximum capacity.

In the latter part of 1910 my Board decided to instal a Fiddes-Aldridge stoking machine, a coal telpherage in our No. 1 coal store, and a De Brouwer coke-handling plant; and for the operation of these new units a pair of 40-KW. Davey-Paxman generating sets were installed in our No. 1 retort-house engine-room, supplied with steam from the adjacent boilers. For the first few months, we had the usual crop of difficulties due to the introduction of an entirely new system of driving; but we soon realized the many economies and conveniences of the electrical system of power application, and sat down to consider a thoroughly comprehensive scheme which would gradually enable us to extend the benefits of the new system to practically all our power-driven units.

The sets originally laid down, though quite satisfactory for the purpose for which they were supplied, were utterly unsuited for the extensive application we had in mind, and were supplemented first by a 138 KW. Bellis-Siemens set, then by a 150 KW. Allen, and in 1919 by a 250 KW. Allen (see fig. 8).

The gradual growth of our plant is shown in the graph (fig. 9), from which it will be noted that our power output has increased from 213,000 B.H.P.-hours in 1911 to 812,000 B.H.P.-hours in 1922; while I may say we now employ between 70 and 80 motors on our works, as against 6 motors in 1911.

A point I particularly wish to emphasize is that the whole of our work's power requirements is now supplied by our No. 1 house boilers, which in 1910 had to be worked to their maximum capacity in order to supply an annual output of about 200,000 B.H.P.-hours. To-day, these same boilers use less fuel, and supply an annual load equivalent to 812,000 B.H.P.-hours—practically the whole of the power required over the total works area. This has been accomplished by the wholesale substitution of old, uneconomical steam-engines by electric motors, and the utilization of the steam raised in No. 1 house boilers in modern high-speed generating sets situated close to the boiler-house.

Broadly speaking, our power plant modernization scheme has enabled us to handle four times our old load with an actual decrease in fuel consumption, while the carburetted water-gas boilers are relieved of the wasteful loads which in the past deprived the generators of an adequate supply of steam. Had we not adopted so extensive a scheme, not only should we have continued to work in an extravagant manner, but in order to meet the ever-increasing demand for power, which is such a feature of a modern works, we should have been obliged to provide an additional installation of certainly not less than three large Lancashire boilers, suitably housed, of course with the usual shift of three men.

As regards the cost of our power, during the year ending March 31, 1922, the 812,000 B.H.P.-hours delivered by the motor driving-shafts worked-out at 1·11d. per B.H.P.-hour, including fuel (coke breeze at 10s. per ton), capital and labour charges. The

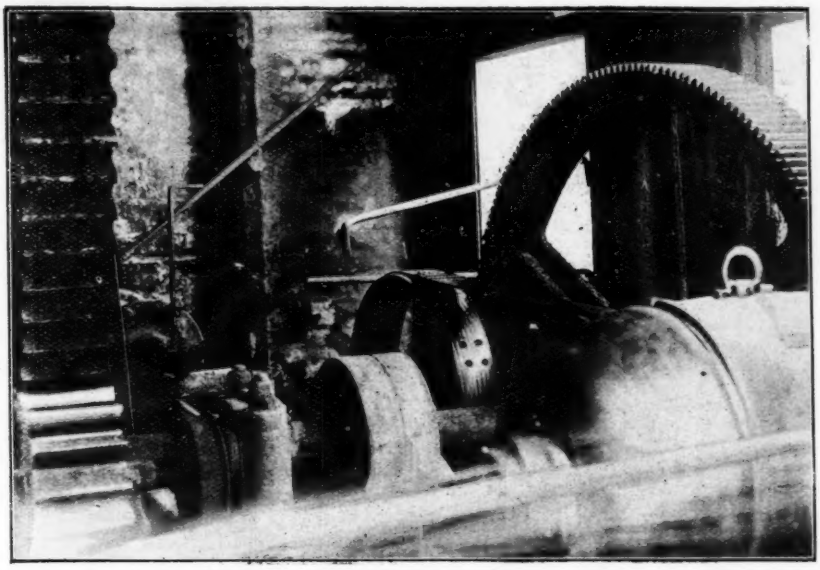


FIG. 11.

cost of our electrical power delivered at the dynamo switchboard works-out at 0·73d. per B.O.T. unit for our annual output of close on one million B.O.T. units. I would particularly draw attention to the striking manner in which the economies we have effected are shown on the graph. The left set of curves shows the relationship between our rapidly rising power output, the falling quantity of fuel consumed, and the total B.H.P. installed. The right-hand set shows the relationship between our annual makes of carburetted water gas and the fuel burnt in the boilers attached to that plant. These graphs, I think you will agree, provide striking testimony of the economies effected.

Referring to the motor B.H.P. curve, it will be noticed that this has risen from about 80 B.H.P. installed in 1911, to 823 B.H.P. in January, 1923. The dotted extension of this curve shows the addition represented by our new carburetted water-gas turbo exhauster, and six new boosters in our new booster-house and valve room, which I have already described. When these are in commission it will be noted that the total B.H.P. installed will be 1083.

GRADUAL GROWTH OF PLANT.

You will note that the process of electrification has been a very gradual one, as shown by the steady rise in the "power installed" curve; and it may be of interest if I briefly define the lines upon which we have worked. We first confined our attention to what I may term the "24-hour jobs," namely, those units of power-requiring plant which run continuously, such as scrubber pumps, Kirkham washers, and exhausters. The conversion of these units of plant brought about a dual saving—namely, by abandoning the old steam-engines we cut out a considerable source of waste, while the addition to our load of a practically unvarying demand brought up our plant load factor, and conduced to a higher degree of economy in the generating sets themselves.

Following upon this we effected considerable fuel economies in our carburetted water-gas engine-room by installing motors for the driving of the blast-fans (see fig. 10).

During those periods when the blast is not required, the fan motors are run at about 80 r.p.m., and acceleration is effected *vid* dashpot-controlled automatic gear. By means of a relay suitably associated with the old steam accelerating gear, the operator has the same complete control over the motor-driven fans as he originally had over the Archer engines, with the exception that the period necessary for acceleration is controlled by the oil dashpots, and remains fixed irrespective of the rapidity with which the operator may open-out his accelerating gear. In this connection I may say that we are about to instal an automatic interlock which will render it impossible for an operator to open his blast valves until the pressure in the blast main is built up to some predetermined minimum.

A particularly important item in connection with such a wholesale scheme lies in the manner in which the old existing units of gas plant are associated with the new modern drive; there is always a temptation to scrap some well-maintained and valuable units of plant simply because it is thought that they are not adapted for conversion. An example of the manner in which old and new plant may be efficiently associated is illustrated in the accompanying photograph (fig. 11), which shows an old Kirkham steam-driven washer converted to electrical operation.

DISTRIBUTION.

The matters I have hitherto dealt with pertain almost entirely to works plant, but I may add that some twelve months ago we took the opportunity of dealing with our distribution department on very similar lines to those on which we are treating our station meters and boosters. The position was much the same. The stove shop occupied one site, while the meter department enjoyed whatever advantages a three-storeyed building may confer in the way of adequate supervision and economic working. All these services have now been concentrated under one roof, and the plan (fig. 12) showing the lay-out requires little explanation.

The store occupies the central position, and round it are ranged the offices, meter testing-room, and meter and stove repair-shops, with accommodation for gasfitters and service-layers. All partitions are constructed of 3-in. clinker-cement concrete blocks (our own manufacture), surmounted by expanded metal, as shown, which give a clear view of practically any one part from any other—there are, in fact, no funk holes. While we have not yet attained the perfection of organization described by our friend, Mr. Sandeman, in that classic paper to which he treated us last year, the lines on which we are working serve our need at present, and lend themselves readily to future elaboration (see fig. 13).

SALES.

Passing from the machinery for the distribution of our finished product to its actual sale, I must in the first place pay a heartfelt (but I fear, as regards expression, a wholly inadequate) tribute to the most admirable work being done for the industry by the British Commercial Gas Association. It is an organization which is at once the envy and the admiration of our electrical friends. Granted that the service to which our Executive Chairman, Mr. Goodenough, and his most able staff have dedicated themselves is one of which they may well be proud, we are more than fortunate in such a capable and happy combination, and we make the utmost use of the brains they are always so ready to place at our disposal. My only regret is that we have still a few, happily only a few, undertakings in our Southern District which are apparently content to reap where they have not sown, and gather fruit from trees that others have paid for and planted. Sheer orchard robbing! But I do make an appeal to these to line up with the rest of us, and to show by the end of this year one hundred per cent. of subscribers from our Southern Area to the "B.C.G.A."

It is a common axiom that the broadcasting of the "B.C.G.A." should be supplemented by local effort; and whatever form this may take, it has only one aim, and that is to get into the closest possible touch with the consumer. His difficulties are so much more personal than ours—and could anything be more irritating than a popping light, a noisy gas-fire, or a badly-cooked or overdue dinner. It is an engaging pastime—the composition of snappy advertisements for local papers—and they have their uses; but much of this no doubt excellent seed falls on stony soil, and we at Plymouth strongly favour the personal contact of the canvasser—the man who actually sees the consumer, talks over his needs and difficulties, satisfies the one, helps him with the other, and turns away his wrath not only with a soft answer but with immediate and practical help. You must, I fear, be thinking that most of the matter I have so far put before you is mere detail, and that to however fine a point it may be carried, it cannot very materially affect those working costs upon which depend the price at which we can afford to sell our finished product. In what way or ways can these be brought down so that we may render still better and cheaper service to the millions who more and more look to us for the thousand-and-one comforts that gaseous fuel can give them?

A glance at any balance-sheet will show that there is little cloth left to cut outside that formidable item that stands at the head of the debit side, "To manufacture of gas," of which (after making the fullest allowance for residuals) coal and oil generally amount to a larger sum than all the other items put together. Few industries are more dependent than our own upon the coal market. In its fluctuations we have little or no voice, and until coal owners

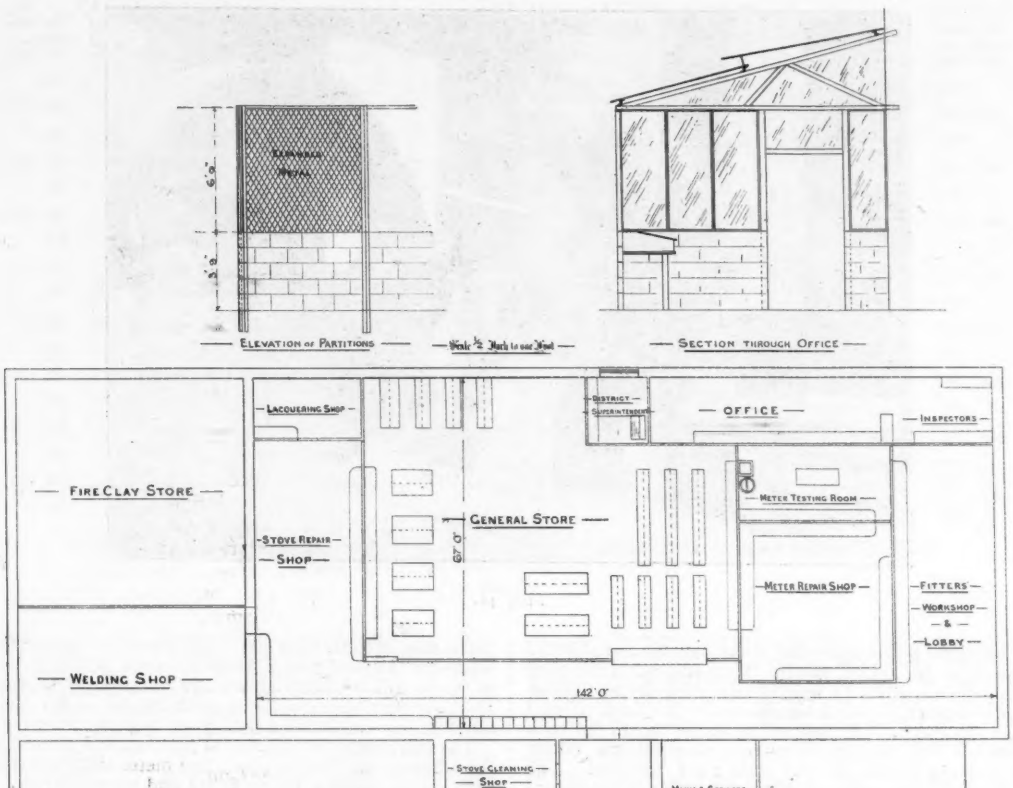


FIG. 12.

and miners cease their interminable wrangling and together become imbued with the ideal of service to the nation and its industries, rather than to themselves (is it too much to hope?), little is to be looked for from this quarter. I may, however, express the hope that, now the questions of standard meter, standard cooker, and standard burner have for the present been settled, a committee—either of the Institution of Gas Engineers, or of the National Gas Council—may turn its attention to a specification for the purchase of coal. It would, I am well aware, be no light task; but if as an industry we could by such a standard form be assured that at least good money should not be spent in return for dirt and short weight, it would be well worth the trouble. In the meantime we must, as hitherto, fall back upon our own resources. I regret that I have no short cut to Utopia to offer you—no three therms for the price of one, or better still, one therm at a third of the price it now costs us to produce it.

Low-temperature carbonization, entailing the production on a large scale of a possibly smokeless, but none the less certainly dust and labour making (not labour saving) fuel, is once more being given a run over the course, backed as ever by the "highest scientific opinion." One need not be a great arithmetician to produce a most attractive balance-sheet premising that coal of unspecified ash content may be purchased at 15s. a ton, and sold after treatment at 50s. No figures are, unfortunately, available to show the amount of coal and coke used to-day for domestic purposes as compared with, say, ten years ago; but every gas fire, cooker, geyser, and boiling ring of the tens of thousands our industry is fixing annually must make an ever-diminishing market for any form of solid fuel.

A plant for the complete gasification of coal, that can be relied upon to produce gas of steady and distributable quality is, I fear, still to be sought. A gas engineer who has burnt his fingers somewhat severely over one of these processes tells me that he is still an optimist, though inclined to exclaim with Browning's Fra Lippo Lippi—

> "It makes me mad to see what men should do
> And we in our graves."

Much, I am convinced, may be done in the utilization of waste heat, and the contemplation of those units which day and night are vanishing into the blue from the stacks of our retort-houses and carburetted water-gas plants is enough to sow nightmares in the brain of any man who thinks in B.Th.U. In our own case, I have quite satisfied myself that by the installation of suitable waste-heat boilers we could close down at least two of our three batteries, and so release some thousands of tons of fuel for gasification or for sale. Still, whether our future lies in the manufacture and distribution of some sort of combustible air or of gas of more than Victorian quality, let us in our utterances keep a middle path between the intemperate gospeller on the one hand and the attitude of the very superior person on the other, remembering, in the light of recent experience, that there are always uninstructed, and often interested, people with a curiously ready access to the Press, only too glad to use an unguarded expression to our detriment. Thanks, however, to the formation of the National Gas Council, and, once more, to the splendid work of the "B.C.G.A.," we are now able, as never before, to present a united front to such attacks—a happily different position from that of ten years ago. These bodies have placed in their true perspective the absurdities that have been written, in many cases by people who really ought to know better, concerning one of the most valuable industrial gases ever placed at the service of man; and I venture to predict that you will seek in vain for the report of the Committee appointed to inquire into the therm system of charging among the headlines of those papers that did us the unintentional service of bringing it into being. In the 22nd Chapter of the Book of Numbers we may read of one, Balaam, who found himself similarly embarrassed.

I feel sure that there is no one of us who does not feel a certain quickening at the thought that this year should see at last established the foundations of a scheme for the education of those who are to follow us in the industry; and may they be better men than their predecessors! As regards the scheme itself, I have no criticism to offer. It has been arrived at after full and protracted consideration by a thoroughly competent committee; but with the ever-increasing responsibility of the gas engineer in regard to both capital expenditure and working costs, it does seem that some training in at least the elements of accountancy and costing might well be included. Such a course might enable these engineers of the future to unravel the mystery of those "overhead charges" which are so insisted upon when we are in the market for certain widely-used gas apparatus. One thinks of these new recruits with a certain amount of envy. They are the heirs to all that mass of valuable technical work which has been accumulated by the labours and experience of men in our industry during the past quarter of a century—to go no farther back!

They will find most of it ready to hand in those ponderous tomes of the "Gas Journal" and "Gas World," under the accumulated weight—and merit—of which our shelves are groaning, and congratulate themselves, as we do, upon the possession by the gas industry of the finest Technical Press in this or any

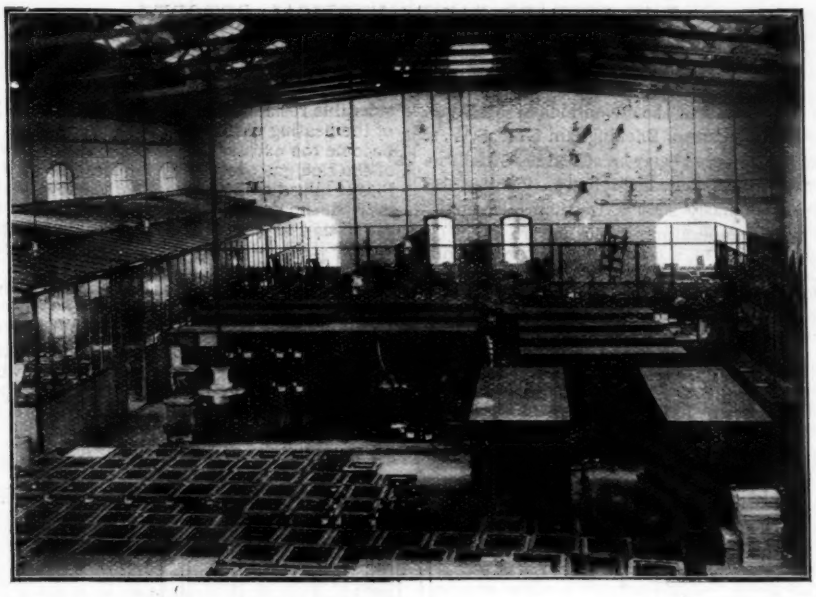


FIG. 13.

other country. Still, they will find much yet remains to be done, for there are to-day as many problems in our industry as at any period in its history. That the right type of man will be forthcoming I have no shadow of doubt, for after all, is there any profession that offers such attractions—I do not speak of the material kind, concerning which much might be said—to a man of catholic tastes and of forward-looking mind, as that of a gas engineer? He is brought into daily contact with problems of chemistry and commerce, of physics and finance, not to speak of those of engineering in nearly all of its most important branches. Above all, he enjoys that finest of educations—an almost unlimited contact with his fellow-men—his directors, his colleagues on the staff and in the industry, his workmen and the vast mass of his consumers who look to him for their light and warmth; and he learns to work with and serve them in that harmony without which neither success for his undertakings nor happiness for himself can be attained. Last, and by no means least, he can put forth his best with a free and untrammelled mind, because in most cases he has the cordial support and confidence of his board or committee.

The remarks made last year by my friend and predecessor in this chair, Mr. J. M. Campbell, upon the utility, or shall I say futility and early disappearance of the address which is expected annually from your President, impressed themselves much upon my mind. Still, as his late fellow-countryman remarked—

"The flighty purpose never is o'ertook
Unless the deed go with it"

and his excellent intention was not translated into action. You, Gentlemen, have been the sufferers for his omission; but if, being drawn together from our widely scattered Southern District for this occasion, I have succeeded in beguiling some part of an hour for you, I trust I may be forgiven, and thank you most sincerely for your patience.

A Vote of Thanks.

Mr. R. Beynon (Torquay) remarked that he did not exactly know why he had been honoured with the duty of proposing a vote of thanks to the President for his address, and could only imagine it was because he was the senior of the Western District of the Association. In the west they looked with a great deal of pride on Mr. Hoyte, and congratulated the Association upon having elected him President. There was in the address a striking trait of originality; and he did not think when the members visited Plymouth they would find in Mr. Hoyte's works any lack of originality. As they had learned earlier that day, they would be assured of a hearty welcome. He hoped as years went by the Association would find a succession of Presidents to do as Mr. Hoyte had done.

Mr. L. Trewby (Mill Hill) seconded the vote, with the remark that the President was not a man who sat down and allowed other people to do things for him. He had worked-out many problems for himself, and they would be able to take advantage of this fact when they went to Plymouth.

The President thanked the members very much for the vote, which had been heartily accorded. He hoped it was an indication that they had not been as disappointed with his little contribution as he himself was. Some of the things he had described, he trusted would be of still greater interest to them when they actually saw them at Plymouth.

LONDON AND SOUTHERN DISTRICT JUNIOR GAS ASSOCIATION.

Short Paper Evening.

There was a meeting of the Association last Friday evening at the Westminster Technical Institute, S.W., for the purpose of hearing and discussing three short papers on distribution phases of the gas industry.

The President (Mr. D. Cleave Cross, of Lea Bridge), who was in the chair, pointed out that the papers dealt with absolutely different branches of the distribution side. Mr. Clark was going to give them an extraordinarily interesting paper, which would require a great deal of following. There was a lot to be learned from it about what went on inside a bunsen burner. Mr. Kerridge was to deal with a matter which had long been close to his heart; and Mr. Stainer's was a very useful paper.

The titles and authors of the papers (which, with points raised in the discussions, will be published in next week's "Journal") were as follows:

"Some Bunsen Burner Problems," by Mr. J. G. Clark, of the Gas Light and Coke Company.

"The Flue Outlet," by Mr. H. W. Kerridge, of Croydon.

"The Gas Company's Showrooms," by Mr. Austin S. Stainer, of Brentford.

On the proposition of Mr. F. S. Larkin (Gas Light and Coke Company), seconded by Mr. W. L. Westbrook (North Middlesex Gas Company), a hearty vote of thanks was passed to the authors, and was acknowledged by Mr. Clark.

Personal.

The President said he was sure the members would wish to offer their congratulations to Mr. T. V. Johns, of Richmond (a member of the Council), who had been appointed Works Manager at Lowestoft. Mr. Johns hoped to remain a member of the Association.

The Hon. Secretary (Mr. George Winslow) expressed his pleasure at being able to report to the members that he had seen their old friend Mr. F. Ainsworth, whose serious illness had recently been reported, and that he was recovering gradually.

Coke-Oven Managers' Association.—A meeting of the Midland Section of the Coke-Oven Managers' Association was held at the Grand Hotel, Sheffield, last Friday. Papers were read by two associate members, for which prizes were awarded. Mr. J. W. Spencer, of Holbrook, read one on "Difficulties Met in Re-Starting a Battery," and Mr. J. D. Morris, of Canklow, Rotherham, the second on "A Few Aids for the Recovery of Benzole.

The Fallacies and Dangers of Socialism.—Messrs. Watts & Co., of Johnson's Court, Fleet Street, have just published a fifth and revised edition of "Socialism: Its Fallacies and Dangers," being a collection of papers edited by Mr. Frederick Millar, which has had a wide circulation as a manual of facts and figures compiled to show the fallacious and dangerous character of the theories of Socialism and Communism. Several chapters forming part of the previous editions have been omitted, and new and important matter substituted. The price of the book is 1s. net.

THE EVERARD-DAVIES VERTICAL RETORTS.

High-Temperature Gas-Works Process Application.

The Everard-Davies processes are the inventions of Mr. Wm. Everard Davies, of Wellington House, Buckingham Gate, S.W. 1. The general principle of the processes may be stated essentially as a carbonization with or without accompanying gasification by the steaming of fuels—particularly such as coal, brown coals, lignite, &c.—at any charge temperatures from 400° to 1400° C. This is preferably carried out in a continuous vertical retort heated externally on one side only, and at the same time heated internally by a small portion of the heating gases passing through the descending charge in a direction transverse to the charge length—*i.e.*, through the charge thickness. The externally heating combustion chambers are in three or four horizontal zones or stages, with the retort under slight suction as usual, or intensified suction if the carbonizing requirements so demand. Various other modifications will be described subsequently.

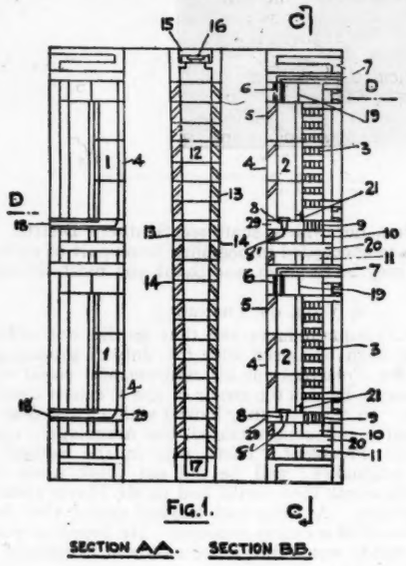


Fig. 1.

SECTION AA. SECTION BB.

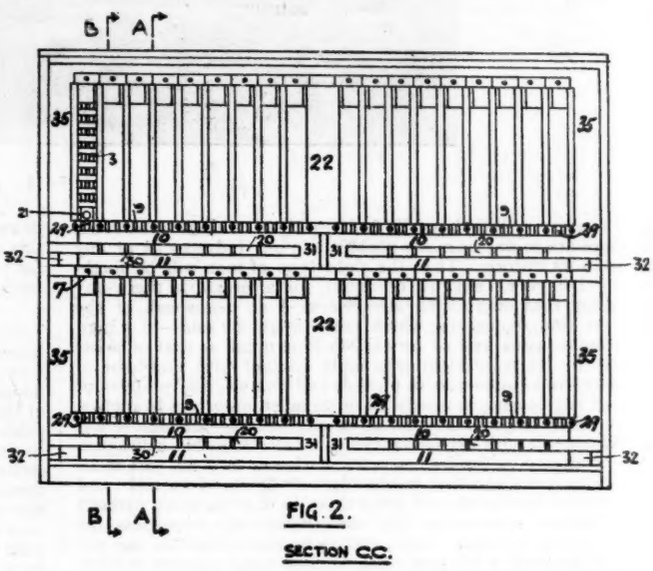


Fig. 2.

SECTION CC.

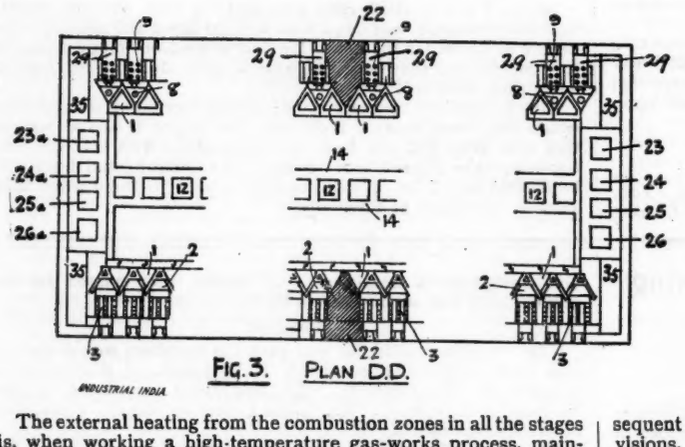


Fig. 3. PLAN D.D.

The external heating from the combustion zones in all the stages is, when working a high-temperature gas-works process, maintained at the usual intensity to ensure the maximum transmission of the carbonizing temperature through the charge, zoning of the charge temperatures mainly resulting by the more or less continuous passage through the retort of raw freshly charged solid fuel, as also in a minor way by means of the reactions maintained in the various stages.

With regard to the principles on which the Everard-Davies processes are based, it is, of course, understood that coal may readily be carbonized in a retort or closed vessel by either external or internal heating. The objection to external heating in gas-works carbonization is the bad heat transmission through the thick walls of the retort (especially when made of fireclay) and the charge of coal inside, so that a long period is required for carbonization with a diminished throughput—the great factor in making all retorting plant previously installed in gas-works as an improvement upon horizontals so costly, while in addition 15 to 20 p.ct. of the coal is required for the heat requirements of carbonization.

The disadvantage of internal heating by means of producer, water, or other gas is the fact that the retort has got to be of great length to get an adequate absorption of the heat and reduction of the temperature of the heating gases. This causes a considerable resistance. Unless such a reduction in the temperature of the heating gases is effected, the thermal losses on the method become too extravagant to make it worth while. Also the whole of the rich gas evolved by the straight carbonization of the volatiles is mixed with the whole of the low quality heating gases, so that the final result is a large volume of inferior or low-grade gas of 275 to 400 B.Th.U. The advantage of internal heating is that it is (when properly handled) much more efficient than external heating, because the heating gas is in more intimate contact with the coal, of which, also, a much larger surface is exposed to the heat.

Principle of Working.

The principle of the Everard-Davies system combines external and internal heating, so as to yield the advantages of both to the full without the disadvantages of either—perhaps a paradoxical attainment! Up to about 25 p.ct. of the heating flue gases after being spent by external heating are passed through the descending charge in the retort, which so augments the efficiency of internal heating from the point of view of heat transmission and absorption that the addition of this amount greatly improves the throughput. The resistance to the effective passage of these gases across the charge thickness is also so low that no practical difficulty exists on this score; the charge conditions being, of course, readily and simply manipulated to permit a ready passage if required, when (say) a very strongly caking coal is used.

The great reason, however, why internal heating is specially effective in this system lies in the scientific application of the method, whereby not only the sensible heat of the gases is utilized for transmission and absorption of heat, but the composition of the heating gases is adapted to effect endothermic or exothermic or both types of reaction with the charge. The paradoxical result augments the heating of the charge in the sense either of economizing thermal losses or of improving the throughput, with consequent balancing of the composite factors in the heating provisions.

Under these conditions, the heat transmission at 600° to 800° C. is quicker than externally heated high-temperature methods at 1095° to 1235° C.—that is, 1 in. per hour penetration of the maximum carbonizing temperature.

The special design of the heating flues is such that by means of triangular flues having the base of the triangle in the retort wall, the flame of combustion of the heating gas is presented to almost the entire surface of the retort wall, thus realizing the maximum possible conductive or external heating effect. This shape of flue yields the maximum strength, solidity, stability, and durability for the minimum amount of material. The minimum thickness of crust or side wall is also obtainable from this form of flue work. Accordingly the transmission of heat by external means is raised to the summit obtainable. Alongside the aforesaid external method of heating is ingeniously combined, without loss to the external heating effect, a system for introducing the infiltrated heating flue gases, together with any extraneous gases, such as steam, hydrogen, oxygen, air, hydrocarbons, water gas, &c.; the infiltrated gaseous mixture being highly superheated in the brickwork flues previous to admission into the retort chamber proper.

The infiltrated gases (as previously stated) are preferably passed through the charge across its thickness. The combined external

and internal heating is preferably restricted to one side only of the charge, the other side lying adjacent to an offtake or discharge passage structure for withdrawing the distilled products, and the retorts being built up in twin combinations per setting with the offtakes centralized between two retorts.

Mass Handling.

Charges from two tons to five tons per retort, or four to ten tons per twin set of retorts, can be dealt with, without requiring that the charge thickness be increased beyond 2 ft. 6 in. This thickness, when using coals not wholly consisting of finely divided material, and a highly conductive refractory as fluework material (like carborundum), permits of a large throughput being realized, whereas an ordinary refractory can be used for charge thicknesses at least equal to 1 ft. 9 in.

The retort chambers or ovens are preferably of large height, up to 36 ft., and of moderate length and width—(say) 5 ft. to 8 ft. 6 in. and 1 ft. 9 in. to 2 ft. 6 in. Retorts over 30 ft. generally contain four stages; those of less height two or three stages. The staged or zoned method of heating in compartments really amounts to the superimposition one above another of three to four retorts; in fact, the system consists of a multi-staged unit, each section of which is separately and completely controlled thermally, chemically, and mechanically.

Low-Temperature Carbonization Incorporated by Primary Distillation Effects.

Since the heating is so intensively developed, the old-fashioned way of heating the charge right round its enclosure walls on throughput grounds loses its necessity. This incidentally results in the advantages of a primary distillation (as against a secondary or redestructive distillation) being made available, by restriction of the heating to one side of the charge releasing the other side for extraction of the distilled products through colder zones than those of their seat of origin or evolution; thereby ensuring conservation of the distillate in its primary condition of liberation. It is well-known that while prolonged heating or exposure of the distillate to highly-heated material results in cracking or secondary decompositions, if the withdrawal is immediate and always through the path of decreasing temperature in the charge, then the volatiles escape almost unscathed by the carbonizing heat, even though the incidence of the temperature in the latter case be appreciably above what is permissible in the former for retention of the richer ingredients carried by the distilled gases. Accordingly, although the heating flues are maintained at high temperatures, ranging from 900° to 1500° C. even, in the top stages of the plant the charge temperatures may be maintained at 450° to 850° C., so as to conserve particularly the methane and olefines while effecting part-redistillation of the oils and tars; in fact, as much as possible is considered advisable in this respect.

Accordingly the straight coal gas yield due to the straight carbonization of the volatiles and to secondary decompositions effected on the tars and oils, which would otherwise be of the order obtained in true low-temperature work, is very high both as to quality and quantity, ranging from 70 to 78 therms per ton at a concentration of 600 to 700 B.Th.U. per cubic foot of gas even when admixed with the inevitable amount of heating gases (the CO_2 of which has incidentally been regenerated to CO in contact with the highly heated coke of the charge) used for internal convection; steaming for water-gas manufacture not being applied.

By steaming of the charge it is, however, possible to raise the gas yields without comparably lowering the calorific value of the total gas make when taking as basis the best pre-existing vertical retort systems, as a high degree of superheat and a better distribution of the steam over the mass of treated fuel is realized by the Everard-Davies method, with the result that gas makes of 85 to 120, and even more, therms per ton of respectively 560 or 450 B.Th.U. per cubic foot can be readily attained.

Heating Gas Made in Retort without Prejudice to other Yields.

With good coals it is quite practicable to realize these yields over and above the thermal requirements of the settings, which are satisfied by separate manufacture of low-grade water gas of 200 to 275 B.Th.U. quality in the lowest compartment of one or more settings of the battery. If, owing to poor quality of the raw coal, the above yields embrace the whole make, a heating allowance not exceeding 10 p.ct. on the coal thermal value (say, 20 to 30 therms—to be supplied from outside) needs to be made.

However, when making its own heating gas, a battery of retorts is adjusted so that the working of some settings at a high degree of gasification of the coke residue in the bottom compartments thereof compensates on the balance of the retorts for the absence of such more or less complete gasification, with the result that from 150 to 175 therms can be isolated therefrom as coke, even on gas yields for these settings of 120 to 100 therms (contributed to the make only) per ton respectively. Accordingly good quality gas in high quantity is realized for the make in both cases; while high-grade coke to the extent of an average yield of 7 to 10 cwt. per ton of total coal treated, *plus* heating gas without outside allowance, is attained, alongside at least the yields of tar, ammonia, and benzole common to vertical retort practice.

In the making of the retort heating gas full use is made of the sensible heat of the escaping gases at a high temperature in this compartment, as also of that contained in the coke. Water heating may be adopted in the former case, whereas the coke may be cooled by either wet or dry steam which, in ascending through the retort charge from the coke receiving chambers, is superheated and decomposed, generating water gas, separately withdrawn from the lowest stage for the retort heating. The heat required to maintain the charge in this section above 950° C. and preferably at 1000° to 1100° C. is supplied through the heating enclosure wall from the fluework.

Construction.

The Everard-Davies installation (as illustrated in figs. 1, 2, and 3) consists of twin vertical retorts preferably continuously operated when applied to gas manufacture, built in fireclay, or silica, or super-refractories, according to the capacity required per unit area. The usual accessories, comprising coal-screening, crushing, elevating, storing, feeding, &c., apparatus, together with coke withdrawing mechanism, housing, mains and pipe connections, hydraulic mains, and tar accessories, are on the usual vertical retort lines with but minor modifications by way of simplification and improved facilities.

Heating Arrangements.

Fig. 1 is a vertical section through the flue-work of the retort, the left (AA) being a section through the centre of the combustion chamber, and the right (BB) through the centre of the perforated waste and extraneous gas flue, showing also the back chequered by-pass flue of the non pre-heated or waste-heat type of retort.

Fig. 2 is a vertical section across CC fig. 1, showing the longitudinal structure of the by-pass arrangements; and fig. 3 is a plan at DD fig. 1.

The external heating takes place on the outside only of the twin retorts, while a central vertical withdrawal, discharge, or offtake passage is arranged between, connected to the exhauster main, and into which are discharged the gases and volatile products from the two retorts.

Fully 75 p.ct. of the heating walls in the Everard-Davies retorts are actually transmitting heat by external means; a further 10 p.ct. at least being reserved for infiltration of the internal heating gases.

Combustion of the heating gas which enters *vid* the burner inlet passage 18 takes place in chamber 1, the spent products of combustion passing upwards and over through the top connecting flue 19 into the downcast infiltrating flue 2 and the chequered back by-pass chamber 3, the division taking place by means of set adjustable control dampers (not shown) placed above 2 and 3 in 19. The flue gases passed into 2 enter the charge *vid* perforations 5 in the crust 4, together with any extraneous gases admitted *vid* the passage 7 and nozzle 6 into 2; the suction in 2 inducing the gases from 6 into 2 without loss. The flue gases from 3 pass out at the bottom through holes 9 into bottom horizontal waste-heat ducts 10 and 11, from which they escape into one or other of the vertical waste-heat chimney channels 23, 24, 25, 26, 23a, 24a, 25a, 26a, according to the side and stage of the setting; or all these may be on one side, releasing the other side for access to the offtake passage for cleaning and release purposes.

It should here be explained that the accompanying drawings are merely illustrative of the essentials of the working procedure, and in no wise show the construction which is adopted for actual building purposes, and which will be described in due season.

The combustion chambers are arranged preferably in four zones, although the present drawings show but two; and the charge temperatures in the various zones are arranged approximately as follows:

Coal Basis 300 *Therms per Ton.*

Top Stage No.	1	400° — 650° C.
Middle ,, ,,	2	600° — 800° C.
,, ,, ,,	3	850° — 1000° C.
Bottom ,, ,,	4	950° — 1100° C.

Stage No.	1	yields rich gas, tar, and tar oils.
,, ,,	2	,, larger quantities of rich gas highly laden with CH_4 and the olefines and benzole.
,, ,,	3	,, rich gas high in CH_4 but admixed with water gas and NH_3 and benzole.
,, ,,	4	,, lower-grade water gas only.

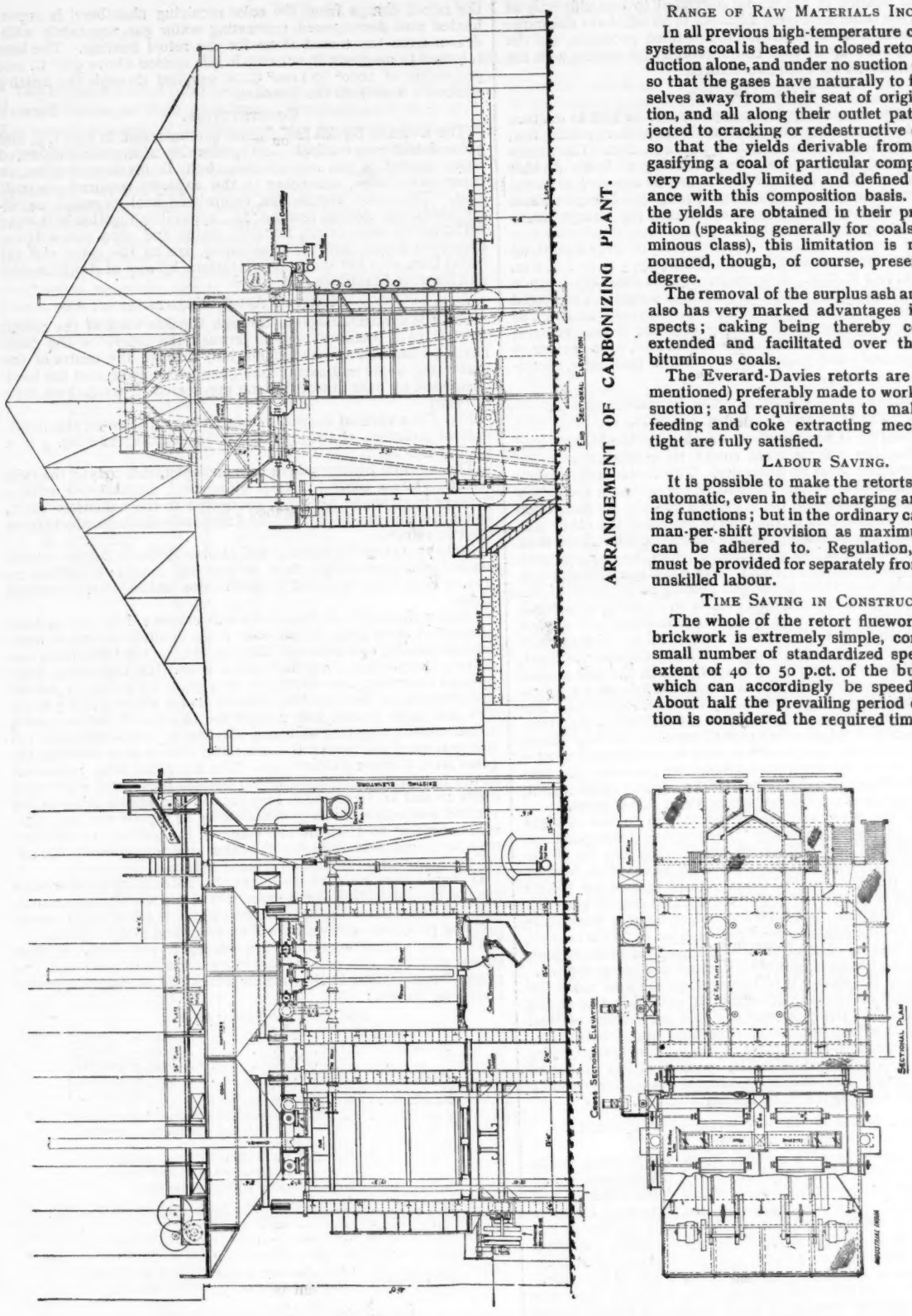
Stage No.	1	distils from	10	to	40	therms (liquid and gaseous).		
,, ,,	2	,, ,,	20	,,	40	,,	,, ,,	,,
,, ,,	3	,, ,,	40	,,	50	,,	,, ,,	,,
,, ,,	4	,, ,,	20	,,	35	,,	(gaseous).	

Distillate: { Average 127·5 therms / But up to 165·0 ,, } per ton of coal treated.

Expansion Troubles Counteracted.

The swelling and frothing of coal under carbonization generally commences at about 350° to 400° C. The chief difficulty with this action in externally heated retorts is that the slow heat transmission means that only 15 to 25 p.ct. of the total time of carbonization, when using a very expanding coal, is available for resolidification, the expansion taking place in one stage and jambing the retort. In the Everard-Davies retorts the expansion may be graduated over two stages, which with quicker heat transmission means a much less severe action, leaving fully 30 to 50 p.ct. of the period of carbonization for resolidification in the case of even a badly swelling coal.

The usual tapers are fully used, as well as all possible available heating and chemical means, in combating swelling. Suction and the early release of the distillate and steaming by a transverse passage through the charge further obviates it very considerably.



ARRANGEMENT OF CARBONIZING PLANT.

Range of Raw Materials Increased.

In all previous high-temperature carbonizing systems coal is heated in closed retorts by conduction alone, and under no suction of any size, so that the gases have naturally to force themselves away from their seat of origin or evolution, and all along their outlet path are subjected to cracking or redestructive distillation, so that the yields derivable from coking or gasifying a coal of particular composition are very markedly limited and defined in accordance with this composition basis. But when the yields are obtained in their primary condition (speaking generally for coals of a bituminous class), this limitation is not so pronounced, though, of course, present to some degree.

The removal of the surplus ash and moisture also has very marked advantages in these respects; caking being thereby considerably extended and facilitated over the range of bituminous coals.

The Everard-Davies retorts are (as already mentioned) preferably made to work under high suction; and requirements to make the coal feeding and coke extracting mechanism airtight are fully satisfied.

Labour Saving.

It is possible to make the retorts completely automatic, even in their charging and discharging functions; but in the ordinary case the one-man-per-shift provision as maximum demand can be adhered to. Regulation, of course, must be provided for separately from the above unskilled labour.

Time Saving in Construction.

The whole of the retort fluework and other brickwork is extremely simple, consisting of a small number of standardized specials to the extent of 40 to 50 p.ct. of the bulk therefor, which can accordingly be speedily erected. About half the prevailing period of construction is considered the required time.

Rust-Dust and Meter Troubles.

Mr. James Ferrier, of the Georgia Railway and Power Company, Atlanta, some months ago investigated an extensive and rapid deterioration of consumers' meters that was being experienced, and found that the principal cause of the trouble was a heavy accumulation of rust. Most of this rust was under the valve cover; and it had, in some instances, been deposited to such an extent as to hinder the movement of the valves, while portions of it had been forced through into the diaphragm space. Upon subjecting the rust to qualitative analysis, he ascertained that it was ine very case heavily charged with cyanides; but if all the cyanogen were arrested, he doubts whether the troubles from rust would be entirely eliminated. After doing the best in the way of purification, sulphur compounds and probably small quantities of ammonia and oxygen will find their way into the mains and services, and form rust or other iron compounds more or less deleterious. This being so, he offers a suggestion for getting over the trouble, so far as meters are concerned. That is, to provide a place for the gas to expand in and deposit its rust before reaching the meter. Such a rust arrester can easily be made of wrought-iron fittings—a 3-in. or 4-in. nipple, with cross, having side openings the size of the service-pipe. The removal of a plug at the bottom would permit of the emptying of the pocket as desired. The device should, if possible, be attached to the service-pipe as it enters the building.

MIDLAND JUNIOR GAS ASSOCIATION.

Dr. Hartley on "Developments in Gas Appliances."

There was a large attendance of members of the Midland Junior Gas Association at a meeting on March 1 at the Council House, Birmingham, when Dr. HAROLD HARTLEY, Chief Chemist of Radiation Limited, read a long paper, our extracts from which, and our report of the discussion, we have divided into two instalments.

DEVELOPMENTS IN GAS-COOKERS.

The lecturer confined his remarks to the gas-cooker, with special reference to the "New World" cooker designed by Messrs. Radiation, Limited.

It was pointed out that, generally speaking, the objects in view in producing new goods were to obtain:

(1) The maximum thermal efficiency.
(2) The maximum domestic efficiency. This means the production of an appliance specially adapted to provide the best conditions for performing the work for which it is intended. This object is the most important of all, and has probably received least detailed consideration in the past.
(3) The production of such a design as shall commend itself to the gas engineer, both as offering domestic economy, reasonable capital cost, and low maintenance cost.

It was pointed out that the requirements to satisfy items 1 and 2 are often diametrically opposed. This was illustrated by reference to hotplates of the parallel wrought-iron bar type and the more modern "efficiency" hotplates. It was mentioned that the mere avoidance of flame contact was not the only factor of importance to ensure hotplate efficiency, as will be obvious to anyone comparing the results attainable with the various so-called efficiency hotplates at present offered to the public.

The lecturer next dwelt in some detail on the consideration of the work to be done by a gas-cooker, and explained:

(1) The nature of foodstuffs.
(2) The effect on them of cooking.
(3) The means to be taken to attain the desired cooking conditions.

It was pointed out that foods contain water, proteins, fats, carbohydrates, mineral salts, and vitamines, the amount varying according to the origin of the food. Foodstuffs can be divided conveniently into two classes: (1) Animal foods. (2) Vegetable foods. The former include the various forms of butcher's meat, poultry, &c., and the latter all foods of plant origin.

Meats are of a fibrous structure, being composed of tubes of elastin held together by a substance called the connective tissue, which yields gelatinous bodies on boiling and is the source of the greatest amount of nourishment. Within the tubes there are the extractives which are the chief source of the characteristic flavour of meat. Extractives are soluble in water and are removable by boiling. The part played by the protein myosin in producing *rigor mortis* after death was mentioned, and the necessity for hanging meat until the myosin has undergone change was intimated. Data regarding the composition of meats were given, and special attention was drawn to the effect of fattening on the composition of beef. This was illustrated by the following table given by Hutchinson in his book "Food and the Principles of Dietetics."

—	Nitrogenous Matter.	Water.	Fat.	Ash.
Lean	21·0	76·5	1·5	1·0
Medium	20·5	73·0	5·5	1·0
Very fat	17·0	53·0	29·0	1·0

The characteristics of meat were summarized as follows:

Meat Summary.

Fibrous structure—tubes of elastin (carve across grain).
Connective tissue—main source of nourishment.
Fat meats have higher nutritive value than lean meats, which contain more water.
Proteins high. Chief muscle protein is myosin, which coagulates after death and causes *rigor mortis*.
Carbohydrates low.
Fat variable.
Fairly high water content in some cases.
Flavour depends on extractives.
A compact food.

Vegetable Foods are distinguished from meats by their high carbohydrate content relative to the other nutrients they contain. The carbohydrate is stored in the plant system as starch, and circulates as sugar. Vegetables differ very markedly in structure from meats, as in the case of vegetation the nutritive portion is contained in cells, the casing of which is cellulose—a very insoluble substance which it is difficult to digest. It was pointed out that whereas meat-foods form a compact food, demanding only a chemical digestion, vegetable matter in general makes a very bulky article of diet. Vegetables constitute our main source of mineral salts, and are an important source of vitamines.

The pulses were dealt with separately. They are distinguished among vegetables by their high nitrogen content, the greater part of which is in protein form. They are also well supplied with carbohydrates, but are poor in fats. They have a high nutritive value. Prior to cooking they require to be soaked in water for a considerable time. Hard water should be avoided for this purpose, because the protein legumen which they contain forms an insoluble compound with such water. Some pulses take up as much as 80 p.ct. of water on soaking. The outstanding characteristics of vegetables were summarized as follows:

Vegetable Summary.

Cellular structure—cellulose enveloping nutrients. (Envelopes must be disrupted to enable nutrient to be digested.)
Carbohydrates high.
Water very high.
Proteins low and not so digestible as those of meat.
Important source of mineral salts and vitamines.
Low in fat.
A bulky food.

Pulses.

Very high in proteins.
Well supplied with carbohydrates.
Low in fat.
Require soaking in soft water prior to cooking.

COOKING OF FOODS.

It was mentioned that there were two objects in the cooking of foods:

(1) To improve the appearance and increase the flavour.
(2) To effect sterilization and preservation.

It was pointed out that cooking does not increase the digestibility of meat foods, although it does increase the digestibility of vegetable foods. Cooked animal foods are less digestible than in the raw state. The general effect of cooking on meat is to loosen the fibres by the gelatinization of connective tissues and to eliminate some fat, and results in a decrease in the water content with a corresponding increase in the nutritive value. Generally speaking, raw meat loses some 20 p.ct. on cooking. In the case of vegetables, the water content increases from 4 to 15 p.ct. by cooking. The increase in bulk coupled with the high indigestible content considerably dilutes their nutritive element, so that for adequate feeding considerable strain must be thrown on the stomach.

By reference to Hutchinson's table given previously, it was intimated that the net loss suffered by meat in cooking is much affected by its nature. Reference was made to some experiments which the lecturer had carried out ten years ago when comparing internally and externally heated ovens. It was emphasized that a great deal of nonsense has been talked in connection with the net loss in weight (mainly water) occasioned by the use of this or that type of oven. The lecturer's experience in this connection was that the design of the oven has but little effect providing it is capable of giving the temperature conditions required for proper cooking. In the case of the two gas-heated ovens to which reference has been made, no evidence was obtained to intimate that the amount of loss was in any way affected by the design of the oven.

The Proteins in meat when heated to 180° Fahr. are coagulated. This temperature is important. It is undesirable that they should be heated to a higher temperature, as excessive cooking only results in the toughening of this coagulated mass. Like those in meat, the proteins of vegetables coagulate and contract on heating, tending to cause thereby a closing-in of the cellulose walls. This would inhibit digestion; but owing to the fact that the cell walls are in the main ruptured during the cooking process by the starch which is rendered soluble, the gain in digestive properties due to this, together with the initial low protein content, leaves the balance considerably in favour of increased digestibility for vegetables as a result of cooking.

Fats are not much affected, although at higher temperatures partial decomposition, resulting in the production of a fatty acid, may occur. It is thus desirable that over-heating shall be avoided in the cooking process. Particular attention has been paid to this point in the "New World" cooker.

The Carbohydrates starch and sugar are much affected by the action of heat. Dry heat converts starch into dextrin—a change which occurs to some extent in the crust of bread and in the making of toast. Moist heat causes a swelling of starch grains and allows of gelatinization. This swelling enables them to rupture the cellulose envelopes in which they are contained in the vegetable foods. It is for this reason that the boiling of vegetable foods increases their digestibility.

Cane sugar melts at 320° Fahr.; at about 390° Fahr., it loses water and is gradually changed into caramel. The formation of caramel often plays an important part in the development of flavouring in cooking, and its formation appears to be important in the production of a well-browned loaf.

Osmazone is the name given to the very savoury substance produced on roasting meat, due to the effect of heat on the extractives. It is a dark-brown sticky substance, and is found on the surface of a properly roasted joint. The formation of osmazone from extractives is somewhat similar to that of caramel from sugar. The presence of osmazone increases the flavour of roast meat.

TABLE I.—*The Composition of Foodstuffs.*

Food.	Water.	Protein.	Ash.	Fat.	Carbohydrates.	Fermentability.	Mineral Matter.	Form.	Digestibility.	Absorption.
Animal: Meat (raw, average) .	P.Ct. 68·37	P.Ct. 18·23	P.Ct. 0·97	P.Ct. 11·50	P.Ct. 2·3 (average) for sheep and ox offal containing above.	—	P.Ct. 1·19 raw beef	Compact	Good	Almost complete. About 95 p.ct.
Hen's eggs (*a*) White	85·7	12·6	0·9	0·25	—	—	0·59	Compact	Very good when lightly boiled. Good when hard boiled.	Almost complete. About 95 p.ct.
Hen's eggs (*b*) Yolk (Hutchinson)	50·9	16·2	0·9	31·75	—	—	1·09			
Fish (raw, average) . .	75·24	18·38	1·26	5·9	—	—	4·6 (in fish roe, including salt)	Compact	Good; on an average better than meat.	Almost complete. About 95 p.ct.
Vegetables (average) .	92·06	1·58 as nitrogenous matter	—	0·37	4·06 and 0·81 cellulose	Ready in the case of potatoes.	1·11	Bulky	Defective	Rather low. Considerable proportion of nitrogenous bodies wasted
Cereals (average of those commonly used) . .	11·75	7·58	—	2·60	67·1 (cellulose 6·58)	—	2·15	Compact	Not ready	Almost complete. (Proteins approximately 80 p.ct.)
Pulses (average of those more commonly used) (*a*) Peas, French beans, and scarlet runners	(*a*) 86·2	2·4	—	0·4	27·0	—	0·63	Tendency to bulkiness, but nutritive value high	Not ready in the stomach	Good for proteins (about 80 to 90 p.ct.). Almost complete for carbohydrates (about 97 p.ct.).
(*b*) Lentils, broad beans, haricot and butter beans . .	(*b*) 10·6	19·5	—	2·07	58·48	—	3·40			

The data given regarding the composition of foodstuffs and the effect of cooking were summarized in tables 1 and 2.

Having dealt with the nature of foodstuffs and the effect of heat on their constituents, the lecturer referred to a further table which had been prepared to indicate concisely the conditions to be attained for the production of the most suitably cooked food in the case of a number of processes in common use.

From the temperature standpoint, the cooker must be capable of meeting the following requirements:

(1) Higher temperature for roasting, grilling, and frying.
(2) Medium temperature for boiling.
(3) Lower temperature for stewing (180° Fahr.).

The hotplate and the oven are each required to meet all three temperature conditions; further, it may be necessary to attain the desired temperature rapidly or slowly according to the nature of the foodstuff. With the ordinary gas-cooker considerable manipulative skill may be necessary to attain success. Anything which will simplify the work will prove a great boon.

In the case of the oven, there is an additional factor peculiar to that part of the appliance to be considered—namely, the influence of the gaseous atmosphere on the food. Mention has been made of the fact that the net loss of weight during cooking—a loss which, for the most part at least, consists of water—does not appear to be affected by the change from an internally heated to an externally heated oven. We know that very many internally heated ovens are in operation and that they give quite good cooking results when used properly. There exists an opinion, however, that the internally heated oven owes its success in this connection to the fact that there is a large excess of air passing through it during use. This point has been the subject of a very careful examination, as the line of development which we had in view would, if successful, decrease largely the excess of air. It will be enough at this stage to say that our results have satisfied us that such a development is not merely permissible, but is actually desirable, and that the reverse opinion cited is erroneous.

In bread baking, for example, we get a better browning effect, indicating a greater caramel formation, when the cooking is done in an atmosphere much richer in superheated steam than in the ordinary oven. This result is in agreement with the known practice of bakers to introduce steam during bread baking, or brush the top of the dough with water immediately before putting the loaves into the oven.

DETAILS OF THE COOKER.

We are now in a position to discuss the details of the cooker, and as the cooking requirements have been defined already, I shall deal with the cooking and efficiency points together.

TABLE II.—*The Effect of Cooking.*

Constituents.	Animal Foods (Baking or Roasting). Raw.	Cooked.	Gain + / Loss −	Fish (Boiling). Raw.	Cooked.	Gain + / Loss −	Vegetables (Boiling). (Hutchinson). Potato—Raw.	Do.—Cooked.	Gain + / Loss −	Cabbage—Raw.	Do.—Cooked.	Gain + / Loss −
	Meat Average.	Meat Average.	P.Ct.	Average.		P.Ct.			P.Ct.			P.Ct.
Water	68·37	52·27	−23·4	75·24	71·26	−5·28	78·3	78·90	− 0·3 to + 2·7	89·6	85·0 to 90·0	− 4·4 to + 0·4
Fat.	11·5	15·25	+32·0	5·9	6·90	+16·96	0·1	0·1	± 0·0	0·4	0·4	± 0·0
Protein	18·23	28·06	+54·1	18·38	20·03	+9·0	2·2	1·65	−25·0	1·1	0·99	−10·0
Ash.	0·97	1·66	+71·2	1·26	1·77	+40·5	—	—	—	—	—	—
Extractives . . .	Beef 2·98	Do. boiled 0·9	−69·8	—	—	—	1 to 4	0·73 to 2·92	−26·8	0·7	0·0	−100
Salts	,, 1·19	,, ,, 1·44	+13·2	—	—	—	0·1	0·06	−38·0	1·3	0·65	−50·0
Carbohydrates . .	—	—	—	—	—	—	18·0	18·0	± 0·0	5·8	3·9	−33·0

REMARKS—

The cooking of meat has the following effects:

1. Coagulates proteins.
2. Reduces extractives.
3. ,, water content.
4. Increases fat percentage.
5. Converts connective tissue into gelatin thus—
6. Loosens the fibres.
7. Renders meat less digestible but more palatable.
8. Increases its nutritive value.

The cooking of fish has the following main effects:

1. Extractives are readily lost on boiling.
2. Increases fat percentage.
3. Lowers water content.
4. Renders fish somewhat less digestible.
*5. Some increase in nutritive value.

[* The fat in fish forms the energy supply for this kind of diet. Thus for a given bulk eaten there is a greater fat percentage in boiled than in raw fish.]

6. Coagulates proteins.

The cooking of vegetables has the following main effects:

1. Coagulates proteins.
2. Increase in water content in general.
3. Reduction of extractives.
4. Swelling of starch grains causes rupture of cellulose matrix.
5. Renders vegetables more digestible.
6. Decreases their nutritive value.

TABLE III.—*Notes on Cooking Conditions.*

Roasting.	Temp.	Grilling.	Baking.	Temp.	Time.	Frying.	Temp.	Time.	Stewing.	Temp.	Time.	Boiling.	Temp.	Time.
	° F.			° F.	Hrs.		° F.	Min.		° F.	Min.		° F.	Min.
Meat: Too high temperatures to be avoided except at the beginning when surface of the meat needs sealing. Care should be taken with thin slices of meat that the initial high temps. do not coagulate and harden the protein throughout the meat. Completeness of sealing shown by puffy form of the meat, caused by imprisoned water-vapour. Desiccation of thin pieces lessened by continuous basting. Loss of flavouring matters prevented and development of others, as osmazone, made possible. Continued overheating should be avoided so that coagulated proteins do not toughen. Good results can be obtained by prolonged heating at 212° Fahr. . . The meat is rotated on a spit in front of the fire.	212	The conditions for roasting meat apply here, but the meat is not rotated; each face is cooked alternately. *Making Toast:* Under the influence of the heat, starch is converted further into the soluble form and dextrin. Some caramel is also produced. The latter produces the colour and characteristic flavour.	*Meat:* See roasting conditions. Here the heat is applied all round. The danger of excessive desiccation is much lessened. Temp. of gases in oven 460° Fahr. with 8 lb. joint . Time for 8 lb. joint, 2 hrs. . . *Pulses:* U. S. A. method, applicable mainly to beans. Parboil in dilute (1 p.ct.) $NaH\ CO_3$ solution. Remove the skins by rubbing. Bake in oven with addition of some fat. *Bread:* On being thoroughly mixed the dough is left for an hour to rise. Put into the oven and keep there for 1 hr. Oven temp. about 430° Fahr. [This expands the gas produced by fermentation, making the loaves porous. Hardens the proteins on the surface and forms the crust by converting some of the surface starch into soluble starch, dextrin, and a little caramel.] Flour contains the protein gluten which makes possible the preparation of bread. During baking, the starch granules burst their envelopes and gelatinize. The protein coagulates. On the surface in addition to soluble starch there is a formation of dextrin (320° to 400° Fahr.), together with a little caramel. At 390° to 410° Fahr. 8 p.ct. of the total starch generally undergoes change. On the crust, the glaze, due to dextrin, is improved by the addition of steam.	460 430 176 320 400 390 410	2 1	*Meat:* Often conducted in shallow vessels with a small amount of added fat. See fish frying for correct conditions. *Fish:* Heat olive oil or good cotton-seed oil to 350° Fahr. Suddenly plunge the food suitably prepared into vessel and leave for 2 or 3 mins.. [The process consists in the sudden exposure of food to high temps., ensuring the almost immediate coagulation of protein together with a little charring.]	350	2–3	*Meat:* Too high temps. must be avoided. Temp. best suited for protein coagulation . . . . Do not resort to simmering, or boiling, as this tends to toughen the meat. If well conducted this forms an ideal way of cooking meat, since then the proteins will be coagulated without hardening, the connective tissues gelatinized and none of the juices lost from the stew liquor. *Eggs:* These set to a tender jelly if heated in water to 170° Fahr. for 10 mins. . . .	180 170	10	*Meat:* Where soup is not the motive the water should be carefully regulated towards a minimum to avoid undue loss of extractives. To further lessen this loss, first plunge the meat into boiling water for a few minutes. This seals up the surface pores and coagulates the surface proteins. Avoid too high temps.—*e.g.*, actual boiling—else the coagulated proteins will be hardened. Temp. best suited 180° Fahr. . . . . *Fish:* Water should be very carefully regulated towards a minimum, as fish extractives are readily soluble in water. It is better to use steam heating. *Vegetables:* Water bulk should be kept as low as possible to avoid loss of extractives. Temperature regulation is not so necessary as in general the higher the temperature the more digestible the plant product . . . . *Pulses:* Soak beans or peas overnight in a 1 p.ct. $NaH\ CO_3$ solution (period not less than 4 hours). Cover with boiling water—($\frac{1}{4}$ p.ct. NaCL) $\frac{1}{2}$ gallon per 2 lbs. legume, and cook in steamer for 1$\frac{1}{4}$ hours. . *Jam:* Rapid boiling desired for setting. Some of cane sugar converted into invert sugar. Prolonged boiling increases the latter and this aids digestion, but hydrolyses gelatinous bodies and impairs power of setting.	212 180 212 212	Few Hrs. 4 1$\frac{1}{4}$

The new cookers possess:

(1) A higher cooking efficiency.
(2) A higher thermal efficiency.
(3) A higher domestic efficiency, in that they are simpler to operate than any appliance obtained previously.

HOTPLATE THERMAL EFFICIENCY AND DOMESTIC EFFICIENCY.

The hotplate burners must be sufficiently powerful to allow of quick boiling of large pans; they must be capable of rapid adjustment to allow of simmering; and, as has been shown, it is important that provision should be made to permit a reduction of consumption which would allow of maintenance at a temperature of 180° Fahr. for stewing, for the preparation of sauces, &c. These conditions must be attained in such a way that the maximum thermal efficiency results—a point of special importance for the hotplate in view of the amount of gas used there. The burners are adjusted to enable half-a-gallon of water to be boiled in from ten to twelve minutes. All are provided with taps to permit of easy adjustment to a cut-down position suitable for simmering, and each hotplate has at least one duplex burner provided with a further device to permit of attaining a stewing consumption. The provision of these devices is one of the most important features from the domestic standpoint, enabling easy attainment of the heat transference conditions required for the cooking on hand without accidental extinction of the burners. The ordinary plug tap allows of gas adjustment; but it is difficult to persuade servants to use the tap. With the ordinary cooker it is a common practice, when gentle boiling is required, not to turn down the gas, but to pull the pan away to one side, so that only a portion of the flame plays on to it. The average maid will not be bothered to stoop down to regulate the gas supply. The cut-down position of the simplex burners, and the full-on position of the smaller burner of

the duplex, provide simmering conditions; the cut-down position of the small burner of the duplex being adjusted for stewing conditions.

The thermal efficiency is high; and to indicate the advance since pre-war days, corresponding results for a "New World" hotplate and a typical pre-war hotplate are given in the table below.

Hotplate Tests.

Boiling Tests—Heating 5 lbs. of Water to 95° C.

—	B.Th.U. Available per Hour (Gross).	Time Taken.	Efficiency Net Calorific Value.
New cooker—			
Simplex	7,436	12'55 min.	58 p.ct.
Typical pre-war cooker—			
Burner A	9,500	12'55 min.	38 p.ct.
Burner B	10,750	,,	34 ,,

Stewing Test—5 lbs. of water maintained at 180° Fahr.

New cooker . .	Simplex burner used	746 B.Th.U. per hour.
	Duplex ,, ,,	708 ,, ,,
Pre-war cooker		1347 ,, ,,

The burners permit of the attainment of an efficiency of roughly 60 p.ct. in heating water to the boiling point, and allow of a correspondingly small simmering comsumption. The stewing consumption for a 500 B.Th.U. gas is about 1¼ c.ft. per hour. The pipe-head burners are a distinct advance on those previously employed, and have been adopted as our standard after careful consideration of the results they give as compared with the ordinary drilled burner. The known disadvantages of the latter type arise chiefly from the small flame orifices and also from the practice of having concentric rows of flames. The flame orifices become choked with spilled foodstuff or get rusted up in the course of time, resulting both in a loss of efficiency and in increased danger of incomplete combustion. The pipe-head burner is free from the choking defect, the narrowest point in the outlet passage being within the head and not at the periphery.

Probably the most important advantage of all—one with which I do not propose to deal in detail this evening—is concerned with the constructional advantages which it offers in hotplate design From the cooking standpoint it is at least as good as the ordinary drilled ring burner, and in certain processes distinctly better—*e.g.*, in heating milk with the pipe-head burner, burning or caking on the sides of the pan is not so liable to happen. With regard to viscid foods, it can be demonstrated that porridge can be cooked in an ordinary pan (not a porringer), pancakes cooked, and jam boiled without any special attention being paid to the process on these hotplates. It has only to be remembered that these hotplates have a very high thermal efficiency; that for a given rate of heat transference a smaller consumption is necessary than with the older hotplates; and that this is even more marked at low rates of heat transmission than at high.

"Smothering."

It is especially important that the design of the burner and the bar be such that the gas is completely burned under all reasonable conditions of use. Careful attention has been paid to this point in the design of the new burners. It will be found that even when the consumption of gas is increased by 50 p.ct. more than the rated consumption, and a large kettle placed over the burner, there is no smell of unburnt gas. For such an increase in consumption to occur it would be necessary for the pressure at the gas rail to rise to about 2¼ times that existing when the burners were adjusted.

Reduction of Rated Consumption.

While the burners are sufficiently powerful to ensure reasonably rapid boiling, it is desirable that the consumption shall not be so high that excessive waste of gas results when vessels are left boiling longer than is required—that is to say, the unavoidable losses in domestic use must be kept down as much as possible. It is for this reason that we have not reduced the time factor, but have reduced the consumption. Not only is waste thereby minimized, but, what is equally important, the volume of products discharged into the kitchen (often ill-ventilated) is correspondingly decreased.

The parts of the hotplate must be designed so that the efficiency obtained from the new cooker is retained throughout its life. The burners and bars are easy to clean. The brasswork has been designed so that it shall not develop leaks after it has been in use for a short time. It is located so as to be protected from damage when pans are placed on to, or removed from, the hotplate; yet at the same time the taps are accessible and their position noticeable at a glance. Consistent with the attainment of a high thermal efficiency, the design of the bar must be simple, and must be such as to allow of easy movement of pots and pans. The griller must be adapted so that it attains a high temperature quickly and allows of rapid and uniform roasting of foodstuffs placed underneath it. The grill pan and grid provided should enable the position of the food to be varied to compensate for its thickness. The grill burner should be easy to adjust, so that when the sealing of the pores of the food—as in the case of grilling steaks—has been brought about, the continuance of the cooking can be done without charring the upper surface. The grill burners, which, owing to their shape, are suitable for the heating of certain larger pans, must be made so that they can be rotated into a boiling position, and must be so designed that they shall be stable both in the boiling and in the grilling positions.

In the "New World" cooker the grill frets stand well away from the crown of the oven, and the grill tin has been designed to satisfy the conditions stipulated. Each burner tap is provided with a cut-down position, and each of the burners can be rotated so that the flames play up vertically, and two additional boiling burners of the poker type are obtained.

(To be continued.)

BRITISH COMMERCIAL GAS ASSOCIATION.

DISTRICT CONFERENCE AT OLDHAM.

A District Conference under the auspices of the British Commercial Gas Association was held at Oldham on Thursday last—Alderman W. Perkins, J.P., the Chairman of the Oldham Corporation Gas Committee, presiding. The conference followed the usual course of such meetings. At the morning session attention was directed to the policy and work of the Association, and to matters more particularly touching the gas industry. The afternoon session was open to the public, and gave opportunity to emphasize the part which gas can, and does, play in the effort to end the smoke nuisance. There was a good attendance at both sessions; the Town Hall being the meeting place.

A Welcome.

The Mayor (Councillor Freeman) gave the visitors a cordial welcome to Oldham. He counted it an honour that Oldham had been selected as the venue of such an important conference. Being himself a member of the Electricity Committee, he thought it right to say that, in his judgment, there was ample room for both electricity and gas. There was plenty of work for the former to do, without encroaching on the gas preserves. As for the Oldham Gas Committee, he regarded them as fortunate in having as Chairman one who was very much in love with his department. Seeing that a paper was to be read which described the gas industry as the "Cinderella of the public services," the Mayor bade his hearers remember that it was Cinderella who walked way with the Prince.

President's Opening Address.

Thanks having been accorded to the Mayor for his welcome,

The President gave his opening address. He remarked that it was about a hundred years since a company was formed to provide for Oldham a supply of gas and water. In 1853 this Company was absorbed by the Corporation; and since that change, the Department had made rapid progress. The annual output of gas was 1600 million c.ft., and the population within the area of supply was round a quarter of a million. It was obvious, therefore, what an important part the gas department of Oldham played in the life of the community. The policy of the Gas Committee was to make the use of gas as easy to consumers as possible; and in pursuance of this policy, they had fixed cookers, fires, and radiators free of all charge. To-day they had over 27,000 cookers in use, and almost 6000 gas-fires, radiators, &c., in addition to those privately owned; and he felt sure he voiced the feeling of the Gas Committee when he said they would not rest content until at least one gas appliance was installed in every house within their area of supply. He pleaded for a reduction in the price of gas to the lowest possible point, so as to combat successfully the disposition to use raw coal for heating purposes.

Policy and Work of the Association.

Apologies for absence were read from Mr. F. W. Goodenough (the Chairman of the Executive Committee of the "B.C.G.A."), and Sir William Kay, J.P. (the Chairman of the Manchester Corporation Gas Committee). In Mr. Goodenough's regrettable absence,

Mr. W. M. Mason (the Manager of the "B.C.G.A.") gave a short account of the Association's policy and work. He submitted that these district conferences had been productive of great good by the education they had spread concerning the tremendous part that gas plays in solving the national and communal problem of smoke pollution.

On the motion of Councillor Sutton (of the Manchester Gas

Committee), seconded by Alderman PHILLIPS (the Chairman of the Salford Gas Committee), approval was expressed of the Association's policy and work.

FACILITIES FOR THE USE OF TOWN GAS.

By W. B. M'LUSKY, of Halifax.

The business of gas supply is, said the author, well established. The number and variety of purposes is increasing daily for which gas may be used with advantage to the consumer. It might therefore be urged that progress is satisfactory, and that there is no need to stimulate growth in any direction by the offer of increased facilities. This is not his view; and he argued that facilities for the use of gas can be improved to the advantage of the consumer and the benefit of the industry.

GAS FOR THE HOUSE.

Gas lighting is still the industry's principal business. Gas is the premier lighting agent, and in point of cost is the cheapest to instal and maintain. This business should not be allowed to languish. Every consumer should have at least one standard gas burner provided, fixed, and maintained for him, labour free. The consumer would then have constantly before him a striking example of satisfactory gas lighting. Orders for lighting points would follow. When the question of the use of gas for other purposes arises, the business can then be quickly settled by friendly discourse. Notwithstanding the admitted attraction of electricity for lighting purposes, 85 p.ct. of domestic lighting is still done by gas. For the heating of rooms, for the warming of water, and for central heating purposes, gas is popular because of its cleanliness and general labour-saving advantages. At ordinary prices, however, gas is not cheap enough to stimulate new business in these directions.

A further difficulty in the way of progress in the domestic field is the high price of appliances. Every allowance must, of course, be made for the increased cost of production, and for many valuable improvements in design and construction, all of which make the apparatus attractive to the buyer and more economical in use. The returns for industrial towns in this area show an average consumption of not more than 15,000 c.ft. of gas per consumer per annum for at least 40 p.ct. of the consumers supplied. It will be agreed that the bulk of these consumers—small as their demand is—use as much gas as they can afford to buy, and they cannot afford the installation cost of elaborate or expensive appliances. The demand by them for gas could be satisfied by a gas-copper, a small cooking or boiling stove, a gas-iron, and a few lighting points. The gas-copper is in many cases a landlord's fixture; but it is often provided by the consumer, chiefly on hire-purchase terms. When this is so, the rent of the appliance and the cost of the gas used almost exhaust the resources of the consumer. It is therefore necessary for the development of business in small houses to provide free of cost the appliances referred to. No class of consumer has a better appreciation of the value of gas, and every effort should be made to meet his needs. In houses of larger size the displacement—occasional or partial—of coal by gas is practicable: but the change will not be rapid.

To encourage the consumer—especially the consumer of limited means—much could be done in the way of substantial reductions in the charges for all gas used in excess of the normal demand. The gas undertakings could well afford to make such concessions, because the increase in the demand for gas which would follow would immediately reduce the incidence of distribution cost per 1000 c. ft. of gas supplied. (Difficulties might arise in the case of gas companies as to basic price in relation to dividend. Fresh legislation might be necessary in order to have the average net price received per therm accepted as the basic price.) The average cost of distribution—maintenance of mains, service-pipes and meters—may be fairly stated at not less than 7d. per 1000 c.ft. of gas sold. The average cost is 15s. per annum per house or per meter in use, equal to 1s. per 1000 c.ft. of gas sold, where the consumption is only 15,000 c.ft. per annum. Obviously if this low average consumption could be increased to 45,000 c.ft. per annum, the cost of distribution would come below the present average for all consumers. The figure of 1s. would, in fact, be reduced to 4d. per 1000 c.ft., so that in fact the small consumer, who is now by his own limited demand making his gas supply too dear for his pocket, would by his extended use of the same supply make it cheap enough for any purpose.

In Halifax the method of increasing business and service suggested is not a mere ideal; it is an accomplished fact. Depression in trade has so reduced the industrial demand for gas in Halifax within the past three years that the sale for trade purposes has decreased to the extent of 130,000,000 c.ft. per annum. This drop in one branch of business—equal to 15 p.ct. of the whole—has been made up by a steady growth in the use of gas for domestic purposes. Six years ago—namely, from the meter readings in March, 1917—improved and perhaps rather unusual facilities were offered by way of reduced rates for gas used in excess of what is called the "standard requirement"—a quantity which varies according to the floor area of the living or reception rooms. Over 7000 users of gas for domestic purposes—fully 25 p.ct. of the whole—have adopted this scheme and examples of some of the results are reproduced.

There can be no question that such concessions are necessary where the price to the consumer is overloaded with charges for things other than gas—for example, high charges for interest and sinking fund; general administration; rates, rent, and taxes; and contributions towards relief of local rates in the case of corporation undertakings. In Halifax these charges represent no less than 1s. 10½d. per 1000 c.ft. of gas sold, leaving only 2s. 1d. for all the expenses from coal wagon to consumer's fittings. In such circumstances nothing can help the consumer and the business so much, or so quickly, as an increased turnover. Therefore, every reasonably practicable facility should be offered to the existing consumer to increase his demand.

Floor Area, Superficial Feet.	Standard Requirement, C.Ft. per Annum.	1916. Consumption, C.Ft.	1916. Cost of Distribution per 1000 C.Ft.	1922. Consumption, C.Ft.	1922. Cost of Distribution per 1000 C.Ft.
			d.		d.
A 188 . .	7,000	17,000	10½	30,000	6
B 210 . .	8,000	25,000	7	58,000	3
C 175 . .	10,000	16,000	10½	33,000	5½
D 344 . .	13,000	66,000	3	90,000	2
E 344 . .	13,000	16,500	10½	124,000	1½
F 772 . .	25,000	68,000	3	187,000	1

Note.—The cost of distribution in both years is calculated on the basis of 15s. per house per annum.

INDUSTRIAL BUSINESS.

In dealing with this aspect of his paper, Mr. M'Lusky said that unless one is prepared to make contracts—and satisfactory contracts could be made on the basis of the load factor—industrial business will not expand. There should be no difficulty in making a contract for the supply of gas to an engine or any appliance on the basis of the horse-power demanded, or on the number of cubic feet equivalent to 1 B.H.P. required for power or any other purpose. If the standing charge was £4 per horse-power, or its equivalent, per annum, the fixed charge for a 10 B.H.P. gas-engine would be £40 per annum, and the charge for gas might be 1½d. per therm, or any other figure which, with the quarterly deposit, would yield the total sum of money required. Such a scale compared with electricity at £6 per kilowatt, *plus* 1d. per Board of Trade unit of energy used, would prove very attractive. There can be no question that if gas-engines, gas-fired steam-boilers, boilers for central heating, water heaters for scullery, bath-room, and other such purposes, large cooking-stoves, confectioners' ovens, gas-fires, and heating stoves generally, were fixed on terms of this kind, business would grow, for the fixed charges per quarter—the most important figure—would be bargained for and the small charge per 1000 c. ft. of gas consumed would make any upward tendency in the demand for gas a matter of little moment compared with services provided.

This system of charging has proved attractive to large users of electrical energy for power purposes, with the result that power business constitutes 90 p.ct. of the daily output of the modern electricity undertaking in industrial areas; and it pays! A typical electrical undertaking in the West Riding industrial area collects on the average £30 per annum from each consumer on the books, of which £8 is required to meet interest and sinking-fund charges. The gas undertaking serving the same area collects 50 p.ct. more money over the year; but the average contribution per consumer in this case is only £5, £1 6s. of which is required to meet interest and sinking-fund charges. Both undertakings pay their way; but obviously the gas department works harder and spends more money in the collection of revenue because of the much larger number of accounts to be dealt with—not to speak of the expenses incurred in supervising and maintaining so many small installations.

Gas undertakings should have understandings and working agreements with authorized fitters, who would attend to their own business and leave the gas undertaking equally free to work for any consumer. There is abundant work for all. A scheme of this kind has been in operation in Halifax for six years. When the user of gas wants service, he invariably applies in the first instance to the gas authority, who accept responsibility for the value in use of each article supplied and fixed. As all fixing is under the supervision of the gas department—direct or through the agency of the authorized fitter—satisfactory results are assured. The foundation of the whole system is the standard specification for pipes, fittings, appliances and burners, and a small range of standard fittings sufficient to meet the general need.

Discussion.

Mr. T. DUXBURY (Engineer to the Oldham Gas Department), in opening the discussion, said he thought the time had come when gas undertakings must be up and doing. Advertising was splendid, but actual work was better still. If they wanted to benefit the public by abolishing the smoke evil, they must supply gas at the lowest possible price, and educate their customers to use it in a proper manner. In his opinion, the prospects of the gas industry were never brighter than to-day.

Mr. SAMUEL TAGG (Preston) quoted figures to show how in Preston, by increasing the day load, they had lightened the cost of gas to the ordinary consumer. In 1909, he said, the output in relation to population was abnormally low, mainly because no prepayment meters were in use. An examination of all accounts, excluding industrial users, gave an average of only 6000 c.ft. each. Since 1909, 16,200 prepayment meters had been fixed—9380 being provided with cooking

stoves—and the average consumption last year, for all prepayment meters, was 18,246 c.ft. In addition, over 20,000 other appliances had been sold outright, at a cost of over £52,000; and the domestic sales of gas had shown an increase of 80 p.ct. during the past ten years. This had reduced the capital charges by 4½d. per 1000 c.ft., which equalled 30 p.ct. of the 1911 costs. An increase in the domestic sales reduced the difference between the summer and the winter load. In 1891 the June output of gas was only one-fifth of the December output; but last year there was sent out in June one-half of the volume sold in December. This had an important bearing on the price of gas.

Mr. J. H. Brearley (Southport) congratulated Mr. M'Lusky and the Halifax Gas Committee on their progressive qualities. He approved the suggestion that gas undertakings should make arrangements with the plumbers, but did not favour the idea of fixing gas appliances free of charge. The appliance was "worthy of its hire." When he was in charge of the gas-works at Longwood, the Company set-up a showroom which was attractive and useful in many ways. The Company had been absorbed by the Corporation, and now he learned, with regret, that the showroom had been closed.

Mr. W. Whatmough (Heywood) spoke of the importance of having fixed charges for large consumers.

Mr. W. M. Carr (Stretford) urged the advisability of selling gas even at cost price to large consumers, because they thereby increased the day load and lessened the cost of production all round. With regard to fixing appliances free of charge, he pointed to the cost of such things, and asked whether it was right to penalize the other customers to this extent.

Mr. S. Meunier (Stockport) expressed appreciation of the lines the paper had taken. There was no doubt that an increase in the consumption per consumer had a very strong effect upon not only the standing charges, but the distribution costs. Great good was to be derived from the employment of one or two practical men to visit the houses of consumers once or twice a year, ask if there were any complaints, and see to the proper adjustment of burners, &c.

Mr. M'Lusky asked all who took an interest in his paper to send him their comments and criticisms, so that he might reply to them.

The Luncheon.

Alderman Perkins presided at the luncheon, supported by the Mayor, Sir Thomas Rowbotham, and others. The Mayor gave the toast of "The King." Sir Thomas Rowbotham proposed "The Chairman and Members of the Oldham Gas Committee," and the Chairman replied. Mr. S. Tagg proposed "The Press," and Councillor Poole, J.P. ("Manchester Guardian"), replied. A little surprise was sprung upon the company by Mr. W. W. Woodward (Salford) proposing the health of "The Officials of the Oldham Gas Department." He took the opportunity to eulogize them and their work.

AFTERNOON SESSION.

Remarks by the President.

The President, in opening the meeting, said that gas had proved such a useful servant to the general public that the present seemed an opportune time to state a few facts which stood to the credit of the much maligned gas undertakings. Few people appreciated the national value of the 1600 gas undertakings. The country had perhaps no greater asset. Time was when the carbonization of coal was carried out with only one object—the production of gas. To-day there was hardly any trade or manufacture in which was not used some substance or another produced by the scientific distillation of coal at the gas-works. He took it the first consideration of gas engineers generally was to increase their sale of gas, not for any advantage which they themselves might obtain, but chiefly to improve the atmospheric conditions of the towns and the health of the people, with all its attendant advantages. He had been informed that there are men who would put a period on the use of raw coal, at the end of which time most of the heating needs of the country would probably have to be met by gas. While he was bound to say that, in his opinion, the time was not yet ripe for drastic action, he felt sure that, if such legislation came about, it would be found that the price of gas would eventually be so reduced that the people would suffer very little financially, and the benefits received would more than compensate for any difference in first costs. From the statistics of the Oldham undertaking, he found that, whereas in the year 1914 the average output of gas per ton of coal used was 12,125 c.ft., it had gone up to 13,928 c.ft. per ton in 1922; and for the current year there would be a very great increase in this direction. He held that any industry which had been in existence for more than a hundred years and yet could show such a marked improvement in the last ten years, still held out great promise for the future. He was strongly convinced that the gas industry was merely at the beginning of its period of usefulness, and that its general use during the next few years would surpass all previous records.

Papers were then read on the following subjects.

EFFECT OF ATMOSPHERIC POLLUTION ON HEALTH.

By Dr. J. B. Wilkinson, Medical Officer of Health, Oldham.

After pointing out the evils which result from atmospheric pollution, Dr. Wilkinson concluded his paper by offering the following suggestions with regard to measures which should be adopted to remedy the prevailing conditions:

(1) The placing of a smokeless fuel on the market at a reasonable price.

(2) The production of a cheap gas supply for heating and cooking. Figures have frequently been presented which prove that for occasional fires for periods of not more than three or four hours, gas-fires are cheaper than coal. There is no waiting for the fire to burn-up; the heat is available in a few minutes. People who start to use gas-fires and complain of the large bills, often forget to allow credit for the tendency to use gas-fires more frequently than coal.

(3) The appointment of skilled official inspectors, under central control, who are not only able to take observations of the mill chimneys, but also to give expert advice to the stokers, &c.

(4) The formation of a public opinion regarding the injury caused by a smoky atmosphere, both commercially and to human life, and a determination on the part of the people that such a condition shall no longer exist, and that, just as the public will have pure water and pure food, so they will eventually insist on having pure air to breathe and the blue dome of a sunlit sky under which to live.

SOME NOTES ON THE CINDERELLA OF THE PUBLIC SERVICES.

By Samuel Tagg, of Preston.

In his paper, the author briefly followed in imagination the experience of a newly-elected councillor who finds he has been appointed to serve on the gas committee. With the enthusiasm of the newly elect, he naturally desires to know something of the undertaking for which he is partly responsible, and therefore seeks the guidance of the gas engineer in a visit of inspection of the gas-works.

After describing what he would see there, Mr. Tagg went on to say that it is probable he would leave the works impressed with the enginering skill and scientific ingenuity displayed in plant and operations for the treatment at high temperatures of large quantities of the raw material coal; and he cannot have failed to notice that large numbers of men are contentedly engaged under conditions as favourable as possible, with little or no lost time due to bad trade, or to have been informed that their rates of wages are uniform in towns of a similar size in the district, and rather higher than are paid in other industries. If he is interested in the question of conservation of coal supplies, he will learn that the modern plant he has inspected returns to the consumer over 80 p.ct. of the heat value of the coal received into the works; and he will compare this with the results obtained by the Prince of the Public Services—viz., electricity—who has proved so extravagant a fellow that he only returns to the consumer at the present time 8 p.ct. of the heat value of the coal he consumes, and even when equipped at great expense with super-power stations will only mend his ways by improving his efficiency to 18 p.ct.

Following his visit to the works, the councillor seeks an interview with the commercial superintendent, eager for information regarding the financial side of the undertaking, the supply of gas, and sale of residuals; and the author proceeded to give an imaginary conversation, in the course of which, among many points, the superintendent emphasizes the following ones: While electricity is being used as a motive power, the convenience and economy of gas for other industrial and domestic purposes is leading to its extended employment in all directions. In industry, it is estimated that in 2700 separate trades there are now nearly 400 different processes in which gas is utilized. There are many industrial processes requiring exact heat treatment, in which the use of town gas will show a marked reduction in running costs through increased output, economy in labour, and general convenience. Again, for power units of moderate size gas will continue a keen competitor with steam, oil, or electricity, as the cost, at 3s. 6d. per 1000 c.ft., is only 1d. per H.P.-hour.

In the home, every day and in every way gas is growing in favour. With good incandescent burners available at a moderate price, gas is the only illuminant in the great majority of homes. Gas cookers or grillers are in universal use. The makers of these appliances have recently effected improvements in their design to facilitate maintenance and cleaning, and have increased the efficiency of the hotplate burners by 50 p.ct. on the pre-war type. Gas-heated wash-boilers are cheap to instal, and cost only 1½d. an hour to run. There is also a big demand for gas-fires, which are now remarkably efficient, as 55 p.ct. of the total heat of the gas is radiated into the room, with a further 20 to 25 p.ct. in the form of low-temperature convection; the balance being utilized to carry away the products of combustion up the chimney and assist in the proper ventilation of the room.

Alderman Waddington (the Chairman of the Halifax Gas Committee), Mr. W. M. Mason, and Councillor Pollard (of the Oldham Gas Committee) offered a few remarks on the excellence and public value of the papers; and the proceedings closed with the customary votes of thanks.

In the evening, Dr. C. W. Saleeby lectured on "Life and Light."

The seventeenth annual parade of commercial motor vehicles was held in Lincoln's Inn last Saturday by the Commercial Motor Users' Association; and the official judges agreed that the competing vehicles were presented in better condition than ever before. Most of the great transport users of London and the Provinces were represented by at least one team comprising three vehicles. The object of the parade is to encourage drivers to take a personal interest in the condition of their vehicles, and to run them without accident. The winning team was entered by Messrs. Thomas Wetherhead and Sons; and one of the Gas Light and Coke Company's was fourth.

CORRESPONDENCE.

[We are not responsible for opinions expressed by Correspondents.]

The Use of Governors and the Therm Committee's Report.

SIR,—We have awaited with interest the report of the Therm Charges Committee, and with reference to the question of governors feel that the finding does not lend itself to that ideal condition of gas supply which should be secured if the highest efficiency is to be brought about. An enormous advantage in this respect is possible, and such an advance would save many an installation, both for light and power, from going over to electrical energy.

The Committee appeared only to consider the question of maximum consumption, and to think that the time element in cooking, or simple operations like boiling, is of greater importance than the most economical use of the gas consumed. The note in the report that the pressure from the governor must be sufficiently high to ensure a proper supply when all the appliances are in use, is a condition which we would hardly have thought it necessary to set forth.

Why is that condition not easily obtained? It is due generally to bad piping; and this will not be overcome until gas authorities have power to insist on the supply pipes being adequate for the services they are to furnish. It is fortunate for the electric light companies that this condition must be observed; but with gas anything seems to be allowed to continue, and the pipes are often much overworked to serve the demand which is now coming on them. It has been stated over and over again by chief gas engineers that ideal conditions of supply include constant pressure. As this cannot be guaranteed, even in the street mains (though it is much better than it used to be, through the care of the distribution engineer), surely some other appliances, such as the small governor, should be encouraged, which will help the consumer to get this constant pressure. His fittings, of course, must be adjusted to the conditions in the house. Satisfactory results can be obtained with gas at 20-10ths to 25-10ths pressure, though from an efficiency point of view we do not think it matters how high the pressure is within limits, provided it be constant.

In the consumer's premises, one has again a distribution system on a miniature scale; but the consumer's governor will eliminate from its own distribution system the variations which must occur in the general distribution mains. The governor should be set at such a pressure that the most distant point is fully supplied when all the appliances in the premises are in use; and if it is functioning properly, this pressure will be maintained whether all are on or only one is on.

No doubt the item of expense, which was referred to during the evidence taken by the Committee, is a serious one; but if it can be proved to the consumer that such expense is justified, we do not think there will be any difficulty in getting him either to purchase the apparatus outright or to take it on hire or a hire-purchase basis. Gas engineers are endeavouring to provide for the public a good quality of gas at the cheapest possible rate; but we hold that they will never give entire satisfaction unless they deal in a thorough manner with the question of constant pressure.

We have in London prevented, by the installation of governors, more than one large consumer of gas from going over to electric light, and at the same time have brought about an immense saving in their gas accounts. The lighting load is still worth looking after, not only on its own account, but because once it is withdrawn in favour of electric light it becomes almost a natural consequence that, if power is required, electrical power will be adopted.

The peripatetic gas-governor canvasser has no doubt often brought the consumer's governor into discredit. His aim is to sell as many governors as possible; and in that case they are often fitted to installations where the conditions are entirely adverse to their use, with the result that complaints about the gas supply are bound to ensue. Gas engineers and managers are therefore not inclined to welcome an instrument which is thus unjustly accused of causing trouble.

The conditions of pressure—at different times of the day, and with the full apparatus on the premises in use—should be taken before any governor is installed; and only after giving these conditions consideration can anyone say that an improved result will be obtained by its use. We have always recommended consumers to consult their gas managers about the installation of a governor, in the belief that the present up-to-date gas engineer or manager considers first his consumer's interests—the efficiency of the gas he supplies, rather than the quantity of gas he sells. A satisfied consumer will, in the end, himself use more gas, besides advertising the fact to his friends.

PEEBLES & Co., LTD.
W. CARMICHAEL PEEBLES, Managing Director.

Tay Works, Bonnington, Edinburgh,
March 19, 1923.

"Captive Fire" Furnace Results.

SIR,—I have read with great interest the editorial notes in your issue of March 21, and am much encouraged by the following sentences:

> "Development in all beneficial directions is desired and welcomed. And for our own part we do not care from which direction development comes—whether from the gas supply industry, or from the manufacturers of the appliances. It matters not an iota so long as we get it, and it contributes (as it must do) to the promotion of the interests of the industry through the public that it serves."

Curiously enough, the same post which brought me the "GAS JOURNAL," also brought the enclosed figures, taken under working conditions. They have been obtained for purposes of comparison with a furnace which, over a three months' run, used 7·02 c.ft. of gas per lb. of aluminium melted under working conditions.

I lay much stress on the conditions under which figures are obtained, because a trial under test conditions, with an expert at the back of it, can but mislead. It is impracticable in any industry to have an expert in attendance, to control every heating device; and even if he were present, he could not rectify every variation of pressure that may occur owing to change in pressure supply, or the amount of gas used at the consumption end.

My system has been known for years, and effects this regulation automatically. So far, the sole remuneration I have asked for is a portion of the economy my system affords. Nothing that I could conceive could be fairer; but the big users of fuel reject my terms. No doubt, if manufacturers of gas heating devices could have frozen me out, and got my patents for nothing, my devices would now be available to the public. I have, however, no intention of being frozen out.

34, *Porchester Terrace, W.* 2, ALEX. A. IONIDES, JUN.
March 22, 1923.

Preliminary Results Obtained by the "Captive Fire" Aluminium Tilting Furnace at Luton.

Date.	Pressure of Gas. Inches W.G.	Temperature of Furnace when Charged °C.	Gas Consumed C.Ft	Lbs. of Aluminium	Temperature of Metal Melted.	Time Taken in Minutes.	C.Ft. per Lb Melted.
March 20 .	3·4	200	940	256	750	90	3·67
March 21—							
Heat 1 .	2 8	cold	919	246	720	105	3·73
,, 2 .	4·2	..	720	246	750	80	2·92
,, 3 .	3 8	..	636	250	750	73	2·54

Boiling Burners.

SIR,—As you have invited correspondence on the subject raised by Mr. Arthur Forshaw in your issue of the 21st inst., we will venture a few remarks.

Our opinion of rings with drilled holes is expressed by the fact that our latest design of boiling-ring provides for annular unbroken discharge at the nozzle. One point which appears to us important is that such a nozzle can be kept clean by running a skewer or thin blade of any description round it; whereas a number of holes involves much more labour. It is a "toss up" whether the "poker" used will clean the hole or the hole clean the poker, and leave the hole fouled.

As regards the difficulty of cooking foods of widely varying consistency, wherein flame contact is in one case harmful and in the other economical and harmless, we do not think Mr. Forshaw has hit upon the best remedy by the use of a loose plate as an accessory to the burner. We have already recognized the facts pointed out by Mr. Forshaw, and at the "Ideal Home" Exhibition had a simple device which admitted of changing the clearance between vessel and burner in a moment, without disturbing either.

On the advice of our Patent Agents we refrained from publicly exhibiting this device, but shall shortly be able to do so. The trials we have made with this arrangement naturally lead us to see no *raison d'être* to interpose a loose plate when dealing with viscous food; but we would like to add that we consider Mr. Forshaw has done a public service by directing attention to a drawback in existing cookers. Housewives may be aware of inherent defects, but a clear-cut technical statement cannot always be obtained from a cook.

Leamington, March 23, 1923. SIDNEY FLAVEL & Co., LTD., (Percival W. Flavel, Managing Director.)

Cast-Iron or Steel Pipes in Gas Distribution.

SIR,—Referring to Mr. B. R. Parkinson's letter in your issue of the 21st inst. under the above heading, I might state that the "spun" iron pipes made by the Stanton Company are provided either with spigot-and-socket joints or with turned and bored joints. I agree with Mr. Parkinson's contention with regard to the merit of the latter form of joint for gas distribution.

Perhaps of greater interest is the fact that, due to the homogeneous nature of the material, it is possible to screw the end of the "spun" pipe and to get a thread not less clean than the thread on a forging. I think the future will prove that this type of pipe will be used largely in competition with other forms of pipe where the screwed joint is essential.

E. J. FOX,
Managing Director.

The Stanton Ironworks Company, Ltd., near Nottingham,
March 22, 1923.

Dunstable Gas and Water Company.—At the fifty-first ordinary general meeting of the Dunstable (Beds.) Gas and Water Company last Friday week, the Chairman (Mr. A. G. Inwards) said regarding the gas business that the result on the past year's working was better than for several years past. There was an increase in the gas sales of about 4 million cubic feet over 1921. The cost of manufacture of the gas used was £12,770. The expenditure was £17,274, and the income £20,589, which left a profit of £3315. The reduction in the price of gas from Oct. 1 decreased the income for the last quarter of the year by over £300. New developments were required; but if the Directors could see fit to make a further reduction, it would be to the Company's advantage. The present price of gas to the ordinary consumer was 1s. 2½d. per therm, or 5s. 5½d. per 1000 c.ft. The dividends declared on the gas undertaking would absorb £1864 16s. The meeting then resolved itself into an extraordinary general meeting, and a resolution was passed authorizing the Directors to create and issue the unissued balance of the share capital of the gas undertaking—namely £7332—as ordinary shares or as redeemable shares as the Directors might decide, and to borrow on mortgage or otherwise such additional sum as was authorized by the Company's Acts.

PARLIAMENTARY INTELLIGENCE.

HOUSE OF LORDS.

Progress of Bills.

The opposition to the Oakham Gas and Electricity Bill having been withdrawn, the order made on the 15th inst. was discharged, and the Bill committed.

South Oxfordshire Water and Gas Bill: Read the third time; passed; and sent to the Commons.

Smethwick Corporation (Gas) Bill: Presented; read the first time; and referred to the Examiners.

A Select Committee, consisting of the Marquis of Bristol, Earl Fitzwilliam, Lord Stafford, Lord Lawrence, and Lord Strathspey, has been appointed to consider the Plymouth Corporation and the Macclesfield Corporation Bills. The Committee will meet on April 19.

Gas Regulation Act.

In the House of Lords on Tuesday of last week, the Earl of Clarendon moved that the draft Special Orders proposed to be made by the Board of Trade under section 10 of the Act on the application of Messrs. Drew-Bear Perks & Co., Ltd. (East Kent Gas Order, 1923), Weston-super-Mare Gas Light Company, and the Ryde Gas Light Company and the Brading Harbour District Gas Company, be approved; and this was agreed to. A similar resolution was passed in the House of Commons on the motion of Viscount Volmer.

A copy was presented of a draft of a Special Order proposed to be made by the Board of Trade under the Act, on the application of the British Gas Light Company, with respect to their Norwich works.

HOUSE OF COMMONS.

Progress of Bills.

Smethwick Corporation (Gas) Bill: A resolution was agreed to that the Standing Orders be dispensed with, and that the parties be permitted to proceed with their Bill.

South Oxfordshire Water and Gas Bill: Read the first time, and referred to the Examiners.

Hoylake and West Kirby Gas and Water Bill: To be considered in Committee to-day (Wednesday).

Therm Report.

Mr. FRANK GRAY asked the President of the Board of Trade whether it was proposed to initiate legislation as a result of the recent report of the Departmental Committee affecting the gas industry of this country.

Sir PHILIP LLOYD-GREAME replied that he was in communication with the representatives of the gas industry in regard to the recommendations, and hoped it might be possible to give effect to the report without legislation.

Rating of Machinery.

A Bill to amend the law relating to the rating of hereditaments containing machinery has recently been issued from H.M. Stationery Office. The extent to which machinery is to be included in the value of hereditaments is provided for in the following clause:

In estimating for the purpose of any local rate, or of the basis or standard thereof, or of any valuation list, the value of any hereditament occupied for any trade, business, or manufacture, there shall be taken into account such machinery and plant only as is—

(1) Fixed or attached to the hereditament, and cannot be removed from its place without necessitating the removal of some part of the hereditament; or

(2) Used in or on the hereditament for producing or transmitting motive power or for heating, lighting, or ventilating the hereditament.

Macclesfield Corporation Bill.—Additional Provision.

Notice has been given by the Macclesfield Corporation of their intention to apply to Parliament, by Petition for Additional Provision, for leave to introduce into their Bill now pending clauses to regulate the supply of gas, and to authorize the supply of power gas by the Corporation in the limits within which they may supply gas.

SOUTH STAFFORDSHIRE MOND GAS BILL.

This Bill, promoted by the South Staffordshire Mond Gas Company, was ordered to be reported for the third reading by the Unopposed Bills Committee of the House of Lords (presided over by the Earl of Donoughmore) on Wednesday, March 21. [The provisions of the Bill were set out in the "JOURNAL" for Jan. 3, p. 33.]

Amendments have been made to the Bill. Originally it contained a clause repealing certain provisions of the Company's Act of 1901 (under which the Company were incorporated) prohibiting the supply of gas by the Company for illuminating purposes. This clause has now been struck out of the Bill; and, in its place, an addition has been made to the clause which gives power to the Company to supply gas in bulk to gas undertakers. This additional sub-section provides that these various provisions of the Act of 1901, so far as they prohibit the supply of gas by the Company for the purpose of illumination, shall not apply to gas supplied by the Company to gas undertakers under the powers contained in this section, nor shall any such provisions apply to the supply of gas by such undertakers in accordance with the provisions of this Act or to the use of any gas so supplied by such undertakers.

LEGAL INTELLIGENCE.

EFFLUENT FROM GAS-WORKS.

On Thursday Mr. Justice P. O. LAWRENCE gave judgment in an action brought by the Marquis of Granby for an injunction to restrain the Bakewell Urban District Council from discharging, or permitting to be discharged, from the Bakewell Gas-Works into the river Wye any gas-tar, or other noxious or injurious liquid or waste product likely to injure or kill the fish in the river. Defendants are the owners of the Bakewell Gas-Works, which abut on to the river. Plaintiff alleged that on May 17, 1922, defendants discharged into the river a quantity of noxious liquid of a highly poisonous character, and seriously injured his fishery, on which he had spent considerable sums. On June 2 plaintiff issued his writ claiming an injunction; and upon motion being made, defendants undertook not to make any discharge from their works until the trial of the action. On Oct. 26 plaintiff alleged that the river was again polluted by a discharge from the works, and he moved to sequestrate the defendant Council for contempt of court; and that motion was ordered to stand over and come on with the trial of the action. Defendants by their defence admitted that on May 17 refuse matter from the works found its way into the river in sufficient quantity to be poisonous to fish; while denying that they had discharged any refuse matter from their works into the river which had killed or injured fish. Defendants said that they were willing to submit to an injunction in the terms claimed, and they paid £75 into court.

His Lordship, after hearing a considerable amount of evidence, said it had been proved beyond reasonable doubt that the fish killed in May were killed by the effluent from the gas-works; and in October a larger quantity of ammoniacal liquor had found its way into the river. This was a serious breach on the part of the undertaking; but as neither the members of the Council nor any of the principal officers were cognizant of it until after it had been committed, he would not order sequestration to issue, though defendants must pay the costs of the motion. If there was any further discharge, they must not expect to be again leniently dealt with. With regard to the claim for damages in respect of injury done to the fishery, he assessed the amount at £150, for which sum he gave judgment for the plaintiff, with costs.

HELPS v. MAYOR AND CORPORATION OF OLDHAM.

In May of last year, Mr. George Helps, of Nuneaton, commenced an action against the Mayor, Aldermen, and Burgesses of the County Borough of Oldham, claiming the following relief: "(1) An account of all royalties due to the plaintiff under an indenture of licence made June 4, 1919, between the plaintiff and the defendants, and payment by the defendants to the plaintiff of the sum found due. (2) Damages for breach of the said indenture of licence. (3) Damages for breach of a contract in writing dated April 29, 1918, made between the plaintiff and defendants. (4) An injunction restraining the defendants from using information given to them by the plaintiff under the provisions of the said agreement. (5) Such further or other relief as the Court shall deem fit. (6) Costs.

Vol. XL., No. 3, of "Reports of Patent, Design, and Trade Mark Cases" contains an account of an application in the case to Mr. Justice P. O. Lawrence, sitting in the Chancery Division of the High Court of Justice, on Jan. 12 last. It is stated here that confidential information relating to the manufacture of coal gas was alleged by Mr. Helps to have been communicated by him to the Works Committee of the Corporation. It was also alleged that by an agreement in writing the Committee had undertaken not to disclose the information without Mr. Helps's authority, and not to use it until an agreement had been made with regard to it, and that a licence to use certain letters patent relating to the manufacture of coal gas had been granted by Mr. Helps to the Corporation. An action was commenced by Mr. Helps against the Corporation for royalties under the licence, for damages for breach of agreement, and for an injunction to restrain the defendants from using the information or ideas communicated to them by the plaintiff, except at a gas-works specified in the agreement. The defendants made an application for particulars of the ideas referred to in the statement of claim.

It was held that the plaintiff must give particulars of such of the ideas as were the subject of letters patent, and also particulars, subject to proper safeguards as to matters that were secret, of any other ideas alleged by the plaintiff to be secret, with liberty to apply.

Mr. J. Abady appeared for the defendants; and Mr. J. Whitehead for the plaintiff.

Gas-Meter Thieves Sentenced at Gateshead.

At the Gateshead Police Court, James Britton and James Adams, labourers, were jointly charged on remand with having stolen 33s. 4d. from an automatic gas-meter. Mary Dixon said that Britton knocked at her door and said her husband had had an accident, and she had to go to the infirmary. Witness went to the infirmary; but her husband was not there, and returned at night all right. When witness got back to the house, she found Detective Lynch waiting. A door panel was broken in, and the meter had been opened. John Wooler, assistant inspector to the Newcastle and Gateshead Gas Company, said the meter showed 6800 c.ft of gas had been consumed. Britton was also charged with having done damage to the door to the amount of 6s. 6d., and with having stolen 19s. 10d. from the meter in his father's house. He pleaded guilty to each charge, and was sent to prison for six months. Adams, who pleaded not guilty, was sentenced to three months' imprisonment.

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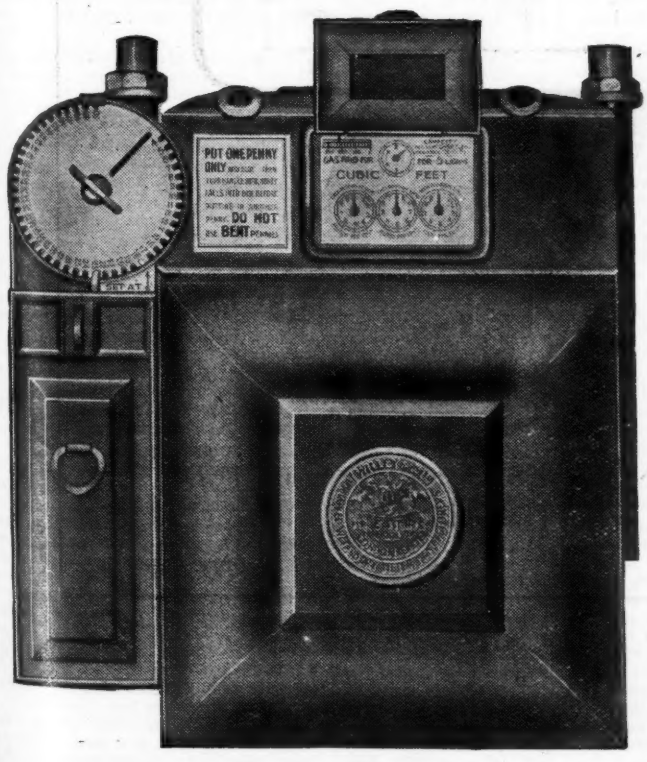

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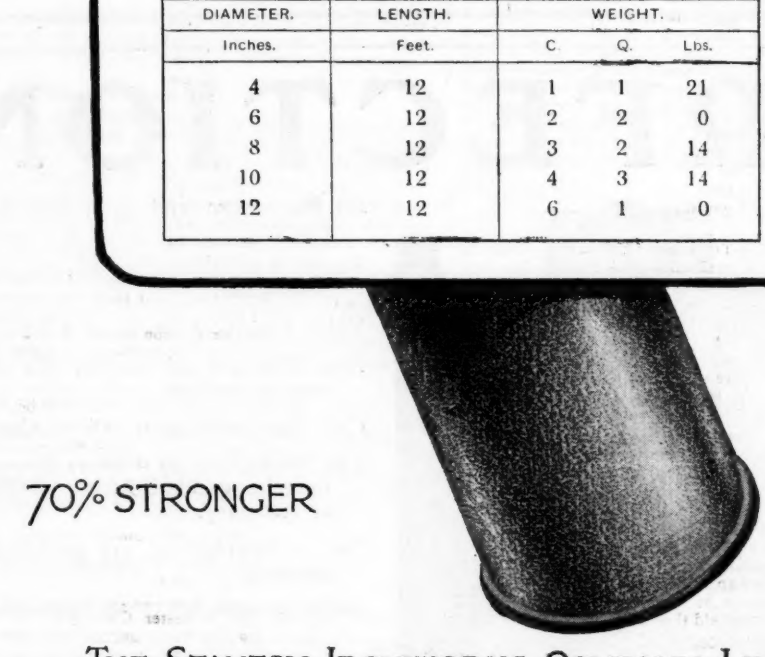

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Birmingham Embezzlement Case.

At the Birmingham Police Court on Thursday, an employee of the Birmingham Corporation, William John Wilks, of Pretoria Street, Bordesley Green, was charged with embezzling the sum of £16 1s. 10d. belonging to the gas department. It was stated that he had been a special inspector in the employ of the department for twenty years. It was his duty to collect special accounts and to render an account of them every Tuesday and Friday. On March 13 Wilks produced his receipt book, which showed certain payments mentioned in the charge. He made out a paying-in slip, but failed to pay in the money. Later he disappeared, but returned on the following Tuesday, and produced the money. He was then told he was too late, as a warrant had been issued. For the defence, Mr. A. Hall-Wright denied any felonious intent. The Bench did not think there was criminal intent, and dismissed the case.

APPLICATIONS FOR PATENTS.

[Extracted from the "Official Journal" for March 21.]

Nos. 7015 to 7775.

ANDERSEN, N. M.—"Gas-cleaning apparatus." No. 7678.
ANDERSEN, N. M.—"Means for regulating and mixing fuel and air for internal-combustion engines." No. 7679.
CORBY, S. F.—"Geysers." No. 7539.
FINCH, C. H.—"Incandescent gas-mantle." No. 7560.
HAMILTON, J. H.—"Gas-driven air-compressor, &c." No. 7581.
HEYL, G. E.—"Rotary retorts." No. 7199.
HEYL, G. E.—"Utilization of carbon residues of distillation retorts." No 7728.
HIGGINS, W. R.—"Gas-fires." No. 7125.
KIRKE P. ST. G.—"Vertical waste-heat boilers." No. 7271.
KROMSCHRÖDER, F. G.—"Dry gas-meters." No. 7265.
M'INTYRE, J.—"Prepayment mechanism for gas-meters, &c." No. 7479.
MILNE AND SON, LTD., J.—See M'Intyre, J. No. 7479.
MONARCH MANTLES, LTD.—"Incandescent mantles." No. 7742.
PERRY, W. P.—"Apparatus for distilling carbonaceous material." Nos. 7078, 7079.
PREMIER GAS-ENGINE COMPANY, LTD.—See Hamilton, J. H. No. 7581.
PRESTAGE, E.—"High-pressure gas-compressors." No. 7415.
RAE, J. H —"Mantle support." No. 7346.
REYNOLDS, J. E.—"Geysers." No. 7509.
SHANNON, J.—"Atmospheric gas-burners." No. 7642.
TERRELL, T.—See Monarch Mantles, Ltd. No. 7742.

Theft of Gas at Glasgow.—A man was charged at Glasgow on March 20 with the theft of 500,000 c.ft. of gas. It was stated he fixed up a tube between his shop and the gas-main, and stole the gas to manufacture illicit whisky. He was sentenced to six months' hard labour.

Waterford Gas Dispute.—The Waterford gas supply was again suspended recently as a result of a dispute between the Company and the workers in regard to the retention of fourteen men under notice. The Manager offered to resign if that would satisfy the workers; but he was informed they would have no compromise—even on such a basis. It is stated that should the strike last much longer, the Gas Company may be compelled to go into liquidation. Up to the end of last week, Waterford was still without gas supply as a result of the dispute.

Bexhill Water and Gas Company.—The balance-sheet shows there is a balance at credit of profit and loss account available for dividend of £9045. It was recommended that a dividend should be declared at the rate of £5 10s. p.ct. per annum on the Company's capital of £34,000 authorized by their Acts of 1885 and 1892; at the rate of £3 17s. p.ct. per annum on the capital of £123,720 authorized by their Act of 1896, Order of 1901, and Act of 1904; and at the rate of £5 p.ct. per annum on the 5 p.ct. preference share capital of £22,350, all less income-tax. This would absorb £3875, leaving £5170 to be carried forward to the next account. Mr. A. H. Kersey (Chairman) presided.

Ownership of the Thrapston Gas-Works.—A controlling interest in the Thrapston Gas and Coke Company, Ltd., has been acquired by a Syndicate of which Mr. C. H. Holland, of Tinsley, Sheffield, is the principal member. The concerns they are interested in include the Desborough Gas Company and the Builth Wells Gas Company. Mr. L. E. Holland, of Desborough, will act as Engineer to the Thrapston Gas Company, and it is the intention of the Company to bring the works thoroughly up-to-date by the installation of modern carbonizing plant, increasing the purifying and other apparatus, and erecting a new holder. Mr. J. E. Harris will continue as Works Manager. Mr. A. G. Brown, the retiring Secretary, has held that office since 1901.

Alliance and Dublin Consumers' Gas Company.—The Directors, in their report for the half-year ended Dec. 31, which will be presented at the meeting to-day, state that the accounts show a profit on revenue account of £54,255; and, after providing for interest on debenture stock, there remains a sum of £46,775, to which must be added the sum of £3912 brought forward, and credit for interest received and income-tax, amounting to £4131, making a total of £54,818. Out of this, the Directors recommend the payment of a dividend at the rate of 5 p.ct. per annum, less income-tax, on the consolidated ordinary stock, which will absorb £38,796, and the appropriation of £4849 to the reserve fund, which needs strengthening, after which a balance of £11,172 will remain to be carried to the next account. As from the reading of the meters for the December quarter, the Directors found it possible to reduce the price of gas by 1d. per therm (or 4½d. per 1000 c.ft.); and they are now gratified at being in a position to make a further reduction of 2d. per therm, or 9d. per 1000 c.ft. These reductions, taken with the one announced a year ago, make a total of 5d. per therm, which is equivalent to 1s. 10½d. per 1000 c.ft. No effort will be spared to make still further reductions possible.

MISCELLANEOUS NEWS.

GAS REGULATION ACT APPLICATIONS.

The following further notices have appeared in the "London Gazette" with regard to applications to the Board of Trade for Orders under the Gas Regulation Act.

DECLARATIONS OF CALORIFIC POWER.

Aldershot Gas, Water, and District Lighting Company.—510 B.Th.U., in substitution for 500 B.Th.U. (June 24.)
Calne Corporation.—470 B.Th.U. (June 16.)
Cromer Gas Company.—475 B.Th.U. (June 30.)
Rickmansworth Urban District Council.—500 B.Th.U., in substitution for 475 B.Th.U. (June 30.)

SPECIAL ORDERS.

Burton-upon-Trent Corporation.

Application is intended to be made by the Corporation for a Special Order under section 10 to empower them to acquire the undertaking of the Repton Gas Light and Coke Company, Ltd., to use scheduled land for gas-works purposes, to extend the area of supply, to charge differential prices in various portions of their area, to regulate the supply of gas, and to borrow money.

Chester-le-Street Gas Company, Ltd.

The Company are applying to the Board of Trade for a Special Order to empower an increase of capital, the provision of additional storage facilities, the extension of the mains and services, and the acquisition of further meters and cookers for the development of the business.

PRICE OF GAS IN DUBLIN.

Corporation Ask for an Inquiry.

By a large majority, the Dublin Corporation passed a resolution, on the motion of Mr. J. Farren, requesting the Free State Ministry of Industry and Commerce to direct an inquiry to be held under section 1, sub-section 3, of the Gas Regulation Act, for the purpose of having revised the powers of charging for gas of the Alliance and Dublin Consumers' Gas Company. The Councillor said he was not in favour of going before the Prices Commission (Cost of Living) now pursuing investigations, because he considered they knew nothing about this matter. Alderman Shields seconded the motion.

Alderman Hubbard Clark moved, as an amendment, that the Council appoint a Committee to give evidence before the Prices Commission, which, he recalled, had been set up by the Government, and had been got together at considerable expense, a proportion of which the Corporation would have to a pay. It would be foolish, he thought, to set up another inquiry. In England and Scotland a Committee had been appointed for this purpose, and the finding was that the therm system had nothing to do with the question of cost. Under this system, the charges for gas had gone down. Alderman Sir Andrew Beattie seconded the amendment.

Alderman Shields held that it was necessary to hold an inquiry into the price, quality, and pressure of gas. It should be held by experts, and might lead to a reduction of price. There was in the estimate a sum of £14,000 for gas consumed by the Corporation; and he believed some reductions could be made in this figure consequent on the result of an inquiry.

Mr. Price (Corporation Law Agent) said the Ministry of Industry and Commerce had pointed out that they had no power to hold a general inquiry, but that they could hold one under the Gas Regulation Act In his opinion, the Corporation would be very ill-advised not to hold this inquiry, because it would be the only opportunity for them to get a proper hearing on the question of pressure, quality, and price. When the Regulation Act was passed, and the therm system set up, an inquiry was held before the Board of Trade. All bodies were invited to present a case; but at that time the Dublin Corporation, owing to the conditions prevailing in Ireland, were not appearing before inquiries held by any branch of the British Government, and, consequently, while they had prepared a splendid case on the method of charging, they had no opportunity of being heard. Now, when they had an Irish tribunal, it would be a mistake not to avail themselves of it.

The amendment was defeated, and the motion carried.

A Fire in an Engine-Room at Rochester.—A fire broke out last Friday week in the engine-room of the carburetted water-gas plant at the Rochester works of the Rochester, Chatham, and Gillingham Gas Company, the result being that the room and the contents were very badly damaged. Fortunately, however, no one was injured, the works were not in any way wrecked, and the supply of gas was not curtailed for one moment.

London County Council and Gas Complaints.—In view of complaints that have arisen with regard to increased gas accounts, the London County Council have decided to print at their own expense a small slip containing particulars as to the testing of both electricity and gas meters, and, in the case of the latter, giving the address of the nearest testing office. This slip will have a gummed edge, so that it can be readily attached to a rate demand note. By this means, it is thought that greater publicity will be attained than by a notice on the back of the demand note. It is not suggested that the practice should be continued, but that the slip should be affixed to the next demand note only. The hope is expressed that those local authorities who have not seen their way to adopt suggestions previously made will agree to the present proposal—particularly in view of the widespread extent to which gas is used for lighting and heating, and of the desirability of informing every consumer exactly how his meter can be tested.

THE NORTH-EAST COAST COAL TRADE.

From Our Own Correspondent.

The week opened with renewed talk of an impending settlement in the Ruhr, and less inquiry for the second half-year in consequence. This attitude, however, was promptly counteracted by news of the strike in the Welsh coalfields. Now at the end of the week the position is rather reversed. The strike is already over; but the reports of the Ruhr situation are less optimistic.

In reality, the actual business transacted has probably been affected very little. There is practically no coal offering for delivery up to the end of June, except such quantities as are held by merchants or speculators. For the second half of the year the position remains unchanged. Sellers are still too optimistic to come down to prices which buyers are willing to pay; and this attitude seems justified considering the quantities they have already sold, and that they have little to gain, apparently, by discounting prices on the present prospects of a Ruhr settlement.

The present high prices are, of course, not always asked for the renewal of old contracts over fairly long periods, which the collieries regard as their regular business, and which are purely subject to negotiations.

While there have been definite reports in circulation of buyers for Continental consumers having received instructions to hold-up their inquiries, the market may be said to have held remarkably firm. Coking has still been the strongest section, and best qualities are firm. The quotation for Wear Specials and best-quality gas (Holmside, New Pelton, Boldon class) may be put at 35s. f.o.b., with seconds at 30s. to 33s. 6d.

YORKSHIRE AND LANCASHIRE COAL TRADE.

From a Local Correspondent.

The situation in regard to the gas coal trade in Yorkshire and Lancashire is rather tight, owing to the collieries shipping a fair amount. Local supplies are scarce, though in consequence of the longer days and the milder weather the demand is declining. There appears an indication that gas-consuming bodies will have to pay slight advances in respect of future contracts.

Household coal is moving slowly, owing to the milder weather. Industrially, there is no change, as trade generally shows little sign of improvement. With regard to exports to Germany, the last few days have seen a falling-off in their requirements, and prices are proportionately lower. Notwithstanding this, between 40,000 and 50,000 tons of coal left the Humber on Wednesday for foreign ports, particularly German.

The Lancashire trade shows some improvement, probably in consequence of the large quantities still being shipped. The house coal trade is improved by the lessening of competition from Yorkshire and Derbyshire collieries. The export demand for washed grades is particularly heavy—doubles and singles still making up to 33s. per ton f.o.b. A keen inquiry continues for coking slack, owing to the demand for furnace coke. Home supplies are better, and prices, at about 65s. per ton f.o.b., are well maintained.

COAL TRADE IN THE MIDLANDS.

From Our Local Correspondent.

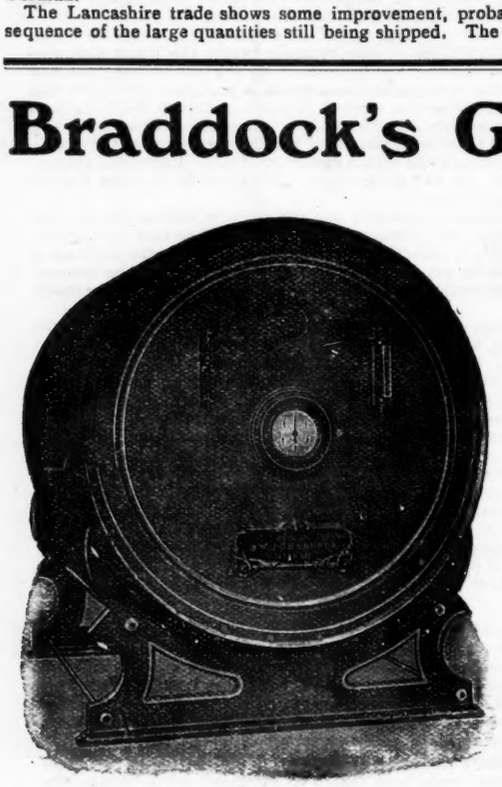
Some of the collieries, particularly those of Derbyshire, have notified gas managements with whom they are under contract that they propose to exercise their right to revise prices for the April-June quarter. Naturally it is an unwelcome announcement to managements. They have to recognize, however, that the situation has undergone a material change during the past two months. There is no marked indication of strain in regard to supplies. Deliveries have been delayed owing to transport deficiencies; but the feeling of large consumers who have been closely watching developments is that productive capacity, as distinguished from distributive facilities, is quite equal to any demand that is made upon it, or is likely to be made, and that the home trade ought not to be penalized because the collieries have had the good fortune to find a profitable market abroad in which to exploit, for the time being, their surplus resources. The matter is now under negotiation between the gas undertakings and collieries concerned. Reports from many quarters indicate that railway transport is not working anything like so efficiently as it did down to a month or so ago. Complete trains between Derbyshire and London are taking as long as a fortnight to do the double journey, so that local shortages of rolling stock are aggravated. While some of the gas undertakings in the South have placed contracts in this district for the half-year June to December, there is no more inclination than of late to enter into new commitments. In any case, the policy of making contracts terminable at the busiest season of the year is viewed with disfavour by buyers. The tension with regard to coke may, it is thought, be relieved by the difficulties of getting shipments away from the ports.

TRADE NOTES.

A Tully Gas Plant for Lille.

The Lille gas undertaking have placed an order for a Tully complete gasification plant, with overhead bunkers, elevators, and coal-handling apparatus and waste-heat boilers, of a daily capacity of 1,000,000 c.ft., with the Ste. Anonyme des Appareils de Manutention and Fours Stein, No. 48, Rue la Boetie, Paris. Mr. J. W. Tully is representing Tully Gas Plants, Ltd., on the Continent.

Braddock's Gas Station Meters



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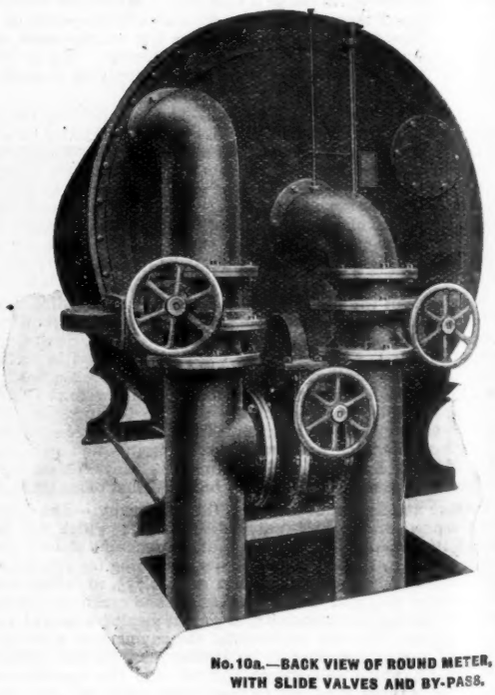

No. 10a.—BACK VIEW OF ROUND METER, WITH SLIDE VALVES AND BY-PASS.

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STOKE-ON-TRENT CENTRALIZATION SCHEME.

Price of Gas Reduced.

The Stoke-on-Trent Town Council on Thursday last considered an exhaustive report by Mr. W. Doig Gibb, O.B.E., whom they had appointed as their expert to advise them on the scheme for the centralization of gas manufacture and supply for the whole borough, prepared by their Gas Engineer (Mr. A. Mackay). The report of Mr. Gibb agreed with the proposals of Mr. Mackay in their entirety; and the Council approved of the report without discussion.

A recommendation by the Gas Committee was confirmed which reduced the price of gas to the uniform figure of 3s. 8d. per 1000 c.ft. (with a sliding-scale for power and industrial purposes) throughout the whole Potteries area. The old prices were: Burslem, 3s. 8d.; Etruria and Stoke, 4s. 10d.; Fenton, 4s. 4d.; and Longton, 4s. 6d.; with lower rates for big consumptions. Uniformity in price, it was explained, was decided upon on account of the centralization scheme, and the consequent unification of the finances of the separate gas undertakings in the various towns.

The Council also approved a recommendation of the Gas Committee for the expenditure of £83,100 for the linking-up of the Stoke and Fenton works.

Alderman F. Hayward complained that Burslem was penalized in the unification of prices, because not only had it cheaper gas at its works than any of the other towns, but it also had a substantial cash balance. He suggested that some consideration should be shown to Burslem; and with the approval of the Council, the Burslem members and the Gas Committee were appointed to deal with the matter.

Referring to the centralization scheme, the "Staffordshire Sentinel" says: We must not delay to congratulate the Corporation and Mr. A. Mackay, the Borough Gas Engineer and Manager, upon the progress made with the scheme for amalgamating the Corporation's gas undertakings with the gas-works at Etruria recently bought from the British Gas Light Company and which will be the headquarters of the local gas supply. The purchase and amalgamation scheme was the work of Mr. Mackay, supported by Councillor C. H. Bowers, the present Chairman of the Gas Committee, Alderman Brookhouse, Alderman Mitchell, former Gas Chairman, and the Committee and the Council generally; while the special co-operation of the Town Clerk (Mr. E. B. Sharpley) and the Borough Treasurer and Accountant (Mr. Thomas Thompson), and others, is also warmly recognized. The purchase having been completed, Mr. Mackay presented his plans for amalgamation; and as a heavy outlay was involved, the Council, while having full confidence in Mr. Mackay, felt that, if only for form's sake, they would like a second opinion. So Mr. W. Doig Gibb was consulted; and in a report presented to the Council, Mr. Doig Gibb thoroughly endorses Mr. Mackay's scheme, and gives it his accomplished and distinguished blessing. Though there was a considerable feeling that it was not necessary to call in a second opinion, the Gas Committee and Mr. Mackay welcomed it, having full confidence in the scheme; and they are completely justified by Mr. Doig Gibb's report. It is another proof of Mr. Mackay's authority as a gas engineer and manager, and lifts his very successful career to a still higher plane, upon which we offer him our heartiest felicitations and our best wishes for the happiest possible completion of the great scheme that he has taken in hand for the Corporation. He is fortunate in his Chairman (Mr. Bowers); and we shall watch the further progress of the work with the highest confidence and expectations.

NATIONAL TRADES EXHIBITION AT BIRMINGHAM.

The National Trades Exhibition was opened at Bingley Hall, Birmingham, last week by the Lord Mayor. It will be continued for two months. This is the twenty-first year of this class of exhibition as organized by Mr. George Stanley (and now conducted by his son, Mr. Charles Stanley) and by reason of its many excellent features has established a reputation for popularity. In the present case the tradition is fully maintained. No fewer than 308,000 persons paid for admission during the 48 days of the last exhibition, and over £3600 has been contributed to the funds of the Queen's Hospital, Birmingham; the amount allocated being 5 p.ct. of the gross admission money.

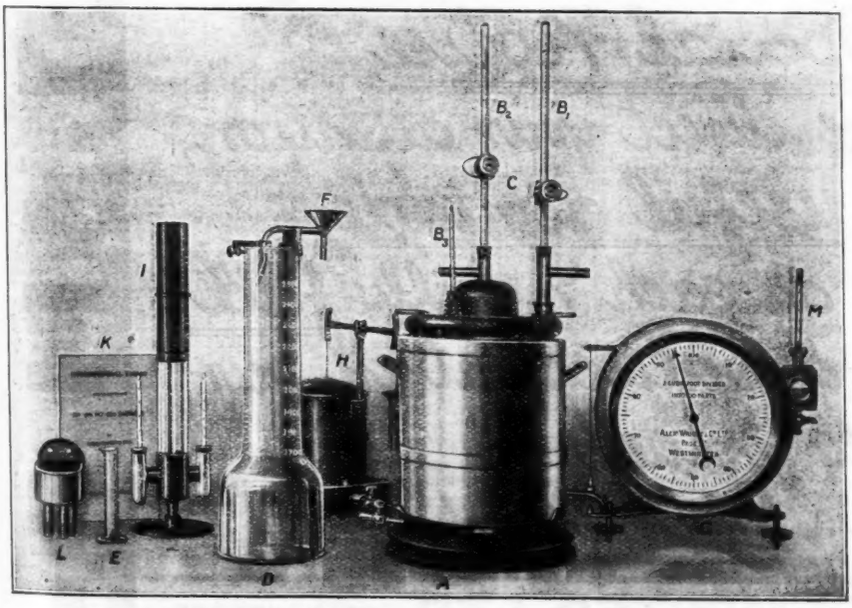
The trade stands are of a most varied kind. For the most part they have relation to those distributing trades which have close application to the needs of the home. There are stands dealing with the latest cooking, heating, and lighting equipment, and with furniture and furnishing novelties.

The stand of the Birmingham Gas Department is large, and the exhibits are of a most comprehensive character; and it is a credit to Mr. R. J. Rogers, Superintendent of the Fittings Department. The Department have specialized on a display of gas-heated appliances suitable for domestic use; and attention is directed to the part which gas plays in the abolition of the smoke evil. Lighting fittings are featured, and in the middle of the stand a bathroom, fitted up with a bath and a gas-heated geyser, is shown. The hot water for the lavatory basin is provided from the gas-heated hot-water circulator on the opposite side of the exhibit. One of the exhibits consists of a gas-cooker and gas water-heater in combination. Prominence is given to the economical use of gas by the application of low-consumption burners; while a display cabinet shows the various types of lighting burners, with a statement as to their respective efficiences.

The "Hurry" Water Heater Company, of Birmingham, exhibit a variety of heaters, both gas and coal fired, for housing and private schemes. The Parkinson Stove Company show various cookers and many other gas-heated appliances.

The Polivit Manufacturing Co., Ltd., London, feature their "Peter Pan" burners.

BOYS CALORIMETER



GAS REGULATION ACT, 1920.

CALORIMETER

as prescribed

by

GAS REFEREES.

ALEXANDER WRIGHT & Co., Ltd.,

1, WESTMINSTER PALACE GARDENS,

WESTMINSTER, S.W. 1.

CURRENT SALES OF GAS PRODUCTS.

[There have recently been complaints as to the variations in quotation in the reports from our tar products market correspondents. In view of this we direct the attention of readers and those who make use of the prices quoted to the editorial article on p. 745 of last week's issue.—Ed. "G.J."]

The London Market for Tar, Tar Products, and Sulphate.

London, *March* 27.

The London tar products market is very firm. Pitch is quoted at about 180s. net per ton at makers' works, but is scarce. The value of creosote continues to rise, and the demand for export is strong. Benzole and toluole have also an upward tendency.

Tar Products in the Provinces.

March 26.

The average values for gas-works products during last week were: Gas-works coal tar, 115s. to 120s. Pitch, East Coast, 185s. to 190s. f.o.b. West Coast—Manchester, 180s. to 185s.; Liverpool, 181s. to 186s.; Clyde, 182s. 6d. to 187s. 6d. Benzole 90 p.c., North, 1s. 6d. to 1s. 6½d.; crude 65 p.c. at 120° C., 1s. to 1s. 0½d. naked at makers' works; 50-90 p.c., naked, North, 1s. 8d. to 1s. 8½d. Toluole, naked, North, 1s. 11d. to 2s. nominal. Coal tar crude naphtha in bulk, North, 8½d. to 9d. Solvent naphtha, naked, North, 1s. 8d. to 1s. 10d. Heavy naphtha, North, 1s. 6d. to 1s. 8d. Creosote, in bulk, North, liquid, 8½d. to 8⅝d.; salty, 7½d. to 8d. Scotland, 7d. to 7⅛d. Heavy oils, in bulk, North, 7d. to 7¼d. Carbolic acid, 60 p.c., 4s. to 4s. 2d. prompt, 3s. 10d. to 4s. forward. Naphthalene, £15 to £16; salts, £6 to £8, bags included. Anthracene, "A" quality, 4d. per minimum 40 p.c., purely nominal; "B" unsaleable.

Manchester District Tar Prices.

The average price realized in the Manchester district for the sale of tar, according to the sliding-scale, for the month of February was £5 11s. 7·35d. per ton.

Auckland (N.Z.) Gas Company, Ltd.—A dividend at the rate of 8 p.c. per annum was declared at the 61st annual meeting of the Company. The profit for the year 1922, after deducting working expenses, cost of repairs and renewals, management expenses, interest, bad debts, depreciation, and other charges, amounted to £68,202. The payment of the dividend named leaves a sum of £32,854 to be carried forward.

Gas Supply of Longridge.—At the Longridge Council meeting on the 21st inst., the question of an official inquiry into the gas supply—a public petition for which has been sent to the Board of Trade—was again raised. The Clerk read letters from the Board of Trade stating that the Gas Company had begun a series of alterations and extensions which would eventually ensure a satisfactory supply. It was mentioned that the quality of the gas had improved considerably in the last few weeks. The matter was deferred.

Fenny Stratford Gas Light and Coke Company.—Mr. C. J. Deyns, who presided at the meeting of the Company on March 9, stated that the revenue account showed a balance of £2528, and that another £100 had been placed to the reserve of the maintenance and works account. The balance to the credit of profit and loss account was £3935, and the Directors recommended the payment of dividends at the rate of 5 p.ct. per annum (less income-tax). There had been an increase in the sales of gas during the year equal to 5 p.ct.

Reduction in Price at Smethwick.—Mr. S. W. B. Stephen (Chairman of the Gas Committee) introducing the report of the Committee at a meeting of the Smethwick Town Council last week, drew special attention to the recommendations with regard to the price of gas. Owing to economy in working costs and the benefit they were now getting from the working of the new plant, they were able to offer a considerable reduction. The predictions made by Alderman Pinkney when he was Chairman of the Committee were now being fulfilled to the letter. The Committee proposed to make a reduction of 7d. per 1000 c.ft. for lighting, and a similar reduction in the price for power purposes. Fourpence of the reduction in lighting would take effect from April 1, and 3d. from July 1. The 7d. reduction in power would become operative from April 1. With regard to public lighting, the Committee had dealt with it very sympathetically, deciding that the price for public lighting would be charged at the rates which applied to the largest power consumer.

Wellingborough Gas Company.—Shareholders in the Wellingborough Gas Light Company will find some pleasing information in the statement of accounts just issued for the six months ended Dec. 31. The profit for the half-year, after providing for interest, amounts to £6609. This added to the balance brought forward from last account gives an available balance of £6938. The Directors recommend that out of this sum dividends of 7½ p.ct. on the original and 6 p.ct. on the additional shares, less income-tax, be declared for the half-year, and that the same be paid on March 1. The payments of dividends and tax thereon will absorb the sum of £3426, leaving £3512 to be carried forward. The satisfactory results for the past half-year have enabled the Directors to make a further reduction in the price of gas, amounting to about 6½d. per 1000 c.ft., or 1⅜d. per therm, and dated from Jan. 1. The shareholders will be asked to pass resolutions increasing the share capital of the Company, giving the Directors power to raise at their discretion the whole or part of the capital so authorized, and to borrow money on mortgage, and further resolutions with regard to the investment of the reserve and special purposes funds.

STOCK MARKET REPORT.

BUSINESS last week on the Stock Exchange was quieter, markets beginning already to show the influence of approaching Easter. But the tone was fairly good in most of them, especially in the choicest lines. Home Governments were in full demand nearly till the close; and Colonials and Indians improved. The Foreign Market was uneven, but had some strong points, notably French and Turks. Russian and Brazilian, however, were down.

Business in the Gas Market was quieter, like the rest; but prices were very firm, and many quotations advanced. In London stocks, the only move was a rise in Gas Light maximum. In Suburban and Provincial, British rose 1, Southampton 3, Swansea preference and debenture 1 each, Tynemouth 6, Wandsworth "B" 2, and ditto "C" and New 5 each. In Continentals, Union rose 3 and European ½. Imperial was dull. In the remoter world, Oriental rose 2; but Primitiva was easy.

The following transactions in gas during the week were recorded: On Monday, Brentford "B" 96⅝, ditto 4 p.c. debenture 78¾, 79, Bristol 90, 90½, Commercial 4 p.c. 94, European 7⅞, Gas Light ordinary 94, 94½, 94¼, 94⅜, 94⅝, ditto 3½ p.c., maximum 64½, Hornsey 137, Imperial Continental 161, 161½, Primitiva 5 p.c. preference 37s. 6d., 38s., South Metropolitan 94½, 94⅝, 94¾, ditto 6½ p.c. debenture 103¾, 104½, South Suburban 100, Metropolitan of Melbourne shares 8¼, 8⅜. On Tuesday, Bournemouth "B" 11 5/16, 11 11/16, Brentford "B" 96⅞, Commercial 4 p.c. 93, 94, European 7⅞, 7⅞, 7 15/16, Gas Light ordinary 94⅜, 94½, 94⅝, ditto 3½ p.c. maximum 64½, 65, ditto 4 p.c. preference 79½, 80, ditto 3 p.c. debenture 61¼, 61⅜, Lea Bridge 94⅜, Primitiva 10s. 1½d., ditto 5 p.c. preference 38s., 38s. 9d., ditto 4 p.c. debenture 70, San Paulo 5 p.c. debenture 37, 38, Sheffield "A" and "B" 96, South Metropolitan 94, 94½, 95¼, ditto 3 p.c. debenture 61, South Suburban 5 p.c. debenture 96, Tottenham "B" 100, Wandsworth-Wimbledon 108, Guildford consols 75, 75½, Hornsey 5 p.c. preference 86½, 87½, ditto 4 p.c. debenture 75, 75½. On Wednesday, Alliance and Dublin 60, Brentford "B" 96, 96⅞, Commercial 4 p.c. 93½, Continental Union 7 p.c. preference 58, European 7 15/16, 8, 8 1/16, Gas Light ordinary 94½, 94¾, 94½, 94⅝, 94¾, ditto 4 p.c. preference 78¾, ditto 3 p.c. debenture 61, 62, Imperial Continental 162, 163½, 164, ditto 3½ p.c. debenture 75½, 76½, Oriental 98¾, South Metropolitan 94½, 94¾, 94⅞, 95¼, ditto 3 p.c. debenture 60½, 61, 61⅛ ditto 6½ p.c. debenture 105⅝, 106, Wandsworth 3 p.c. debenture 57½. On Thursday, Aldershot 75⅞, 76¼, ditto 4 p.c. preference 67½, 68, Alliance and Dublin 61, British 38½, ditto 4 p.c. debenture 77½, Croydon sliding-scale 101½, 102½, European 8 1/16, 8⅛, 8¼, 8⅜, Gas Light ordinary 93¾, 94, 94⅛, 94¼, 94⅜, 94⅝, 94⅝, ditto 3½ p.c. maximum 64⅜, 65, 65⅜, ditto 4 p.c. preference 79½, 79⅝, 79⅞, ditto 3 p.c. debenture 61½, Imperial Continental 161½, Maidstone 109½, 110½, Newcastle 79, 79½, Oriental 98⅜, 99¾, South Metropolitan 94½, British (Hull) 3½ p.c. debenture 63, 63½. On Friday, Bombay 95s., Brentford "B" 97½, British 38½, ditto 4 p.c. debenture 76, European 8½, 8 5/16, 9, Gas Light ordinary 94⅛, 94¼, 94⅜, 94⅝, 94⅞, 94⅞, ditto 3½ p.c. maximum 65, South Metropolitan 94½, 95¼, Aldershot 5 p.c. "A" 88, British (Hull) 3½ p.c. debenture 63, 63½, Southgate District 5 p.c. preference 85.

In the Money Market, there was no particularly salient feature to note. At the opening, rates were fairly easy, but they steadied before long, and thenceforward firmness ruled to the end of the week. Discount terms were consistently easy, and business was rather dull. Silver was variable, but closed fairly steady. The Bank of England rate was 3 p.c., as fixed on July 13.

ANTE-WAR PRICES AND DIVIDENDS, LATEST DIVIDENDS, AND LAST WEEK'S TRANSACTIONS.

Issue.	Share.	When ex-Dividend.	Ante-War Dividend & Bonus.	Last Dividend.	NAME.	Closing Prices, July 30, 1914.	Present Prices.	Lowest and Highest Prices of Transactions.
£			p.c.					
131,978	Stk.	Feb. 22	—	5%	Aldershot 5 p.c. max. C.	..	74–79	75½–76½
190,492	,,	,,	4	4%	Do. 4 p.c. Pref.	..	66–72	67½–68
1,551,868	,,	Oct. 5	2½	5%	Alliance & Dublin Ord.	59–64	59–62	...
374,000	,,	Jan. 11	4	4%	Do. 4 p.c. Deb.	76–79	60–65	...
280,000	5	Oct. 19	7½	4/–	Bombay, Ltd.	5⅛–6⅛	4¼–5	95/–
100,000	5	Feb. 22	16	8/–	Bournemouth Gas and Water: B 7 p.c.	15–15½	11–12	11 5/16–11 11/16
383,110	10	,,	7	7/–	Bournemouth Gas and Water: Pref. 6 p.c.	13½–14	9–10	...
115,000	10	,,	6	6/–	Bournemouth Gas and Water: 4 p.c. Deb.	..	71–76	...
162,065	—	Dec. 29	—	4%	Brentford A Consolid.	261–266	95–98	...
992,045	Stk.	Feb. 22	14	61/–	Do. B New	204–209	95–98	96–97½
734,920	,,	,,	11	61/3	Do. 5 p.c. Pref.	109–111	85–90	...
55,000	,,	,,	5	5%	Do. 4 p.c. Deb.	91–93	75–80	78–79
221,400	,,	Dec. 14	4	4%	Brighton & Hove Orig.	208–213	163–168	...
214,775	,,	Mar. 8	11¼	4%	Do. A Ord. Stk.	154–159	117–122	...
244,200	,,	,,	8	8¼%	Bristol 5 p.c. max.	..	83–92	90–90½
1,272,500	Stk.	Feb. 22	5	5%	British	44–45	38–40*	38½–38½
570,000	20	Mar. 22	12½	20/–	Do. 7 p.c. Pref.	..	12–13	...
10,000	10	Dec. 29	—	7/–	Do. 4 p.c. Deb. Stk.	88–90	75–80	76–77½
120,000	Stk.	June 29	4	4%	Buenos Aires 4 p.c. Deb.	85–87	55–58	...
220,335	,,	Dec. 29	4	4%	Cape Town & Dis., Ltd.	1½–2½	6¾–7½	...
100,000	10	Nov. 2	—	—	Do. 4½ p.c. Pref.	4–6	6–7	...
100,000	10	Oct. 19	—	—	Do. 4½ p.c. Deb. Stk.	70–75	72–77	...
100,000	Stk.	Dec. 29	4½	—	Cardiff 7½ p.c. Deb.	..	102–104	...
237,860	,,	,,	—	7½%	Chester 5 p.c. Ord.	108–110	..	...
157,150	,,	Feb. 26	5	5%	Commercial 4 p.c. Stk.	106–108	92–95	93–94
1,513,280	,,	Mar. 8	5/9/4	60/–	Do. 3½ p.c. do.	103–105	92–95	...
360,000	,,	,,	5½	60/–	Do. 3 p.c. Deb. Stk.	69½–71½	55–60	...
475,000	,,	Dec. 14	3	3%	Continental Union, Ltd.	76–79	25–30	...
800,000	,,	Dec. 15	4	—	Do. 7 p.c. Pref.	115–118	55–60	58
200,000	,,	Dec. 14	7	4%	Croydon sliding scale.	..	100–103	101½–102½
660,000		Mar. 8	—	6%	Do. max. div.	..	82–85	...
284,975		,,	—	5%	Derby Con. Stk.	123–125	..	...
492,270	Stk.	—	6	4½%	Do. Deb. Stk.	102–104	..	...
55,000	,,	—	4	4%	East Hull 5 p.c. max.	..	..	...
209,000	,,	Oct. 5	—	5%	European, Ltd.	17½–18	8–9	7⅞–9
1,002,180	10	Jan. 25	10	5/0	Gas Light & Coke: 3½ p.c. max.	..	93–95	93⅛–94⅜
16,546,120	Stk.	Feb. 8	4/17/4	52/–	Gas Light & Coke: 4 p.c. Ord.	98–102	64–66	64⅛–65⅛
2,600,000	,,	,,	3½	35/–	Gas Light & Coke: 4 p.c. Con. Pref.	96–99	78–80	78⅛–80
4,062,235	,,	,,	4	4%	Gas Light & Coke: 3 p.c. Con. Deb.	74½–74½	60–63	61–62
4,761,930	,,	Dec. 14	3	3%	Gas Light & Coke: 10 p.c. Bonds	..	..	...
130,000	,,	Dec. 11	10	10%	Gas Light & Coke: 7½ p.c. Ilford Deb.	..	..	...
—	—	—	—	—	Hastings & St. L. 5 p.c.	..	92–97	...
82,500	,,	Mar. 8	5	65/7½	Do. 3½ p.c.	87–89	73–78	...
258,740	,,	,,	3½	50/7½	Hongkong & China, Ltd.	16½–16½	6–7	...
70,000	10	May 18	11	7½%	Hornsey 7 p.c.	..	135–140	137
86,600	Stk.	Mar. 8	9	9½%	Imperial Continental	150–160	160–165	161–164
1,976,000	,,	Nov. 16	9	£5	Do. 3½ p.c. Deb. Red.	84–86	73–78	75⅛–76½
404,800	,,	Feb. 8	3½	3½%	Lea Bridge Ord. 5 p.c.	119–121	93–98	94⅛
235,242	,,	Mar. 8	6½	6½%	Liverpool 5 p.c. Ord.	..	..	...
2,498,905	,,	Feb. 26	10	37/6	,, 7 p.c. Pref.	..	102–104*	...
600,000	,,	Mar. 22	—	7%	Maidstone 5 p.c.	..	107–112	109½–110½
165,736	,,	Feb. 22	7/5/6	80/–	Do. 3 p.c. Deb	..	53–58	...
63,480	,,	Dec. 29	—	3%	Malta & Mediterranean	4⅛–4⅛	3⅛–3⅛	...
75,000	5	June 29	6	6%	Met. of Melbourne: 4½ p.c. Deb.	99–101	97–100	...
100,000	100	Oct. 2	4½	4½%	Monte Video, Ltd.	11½–12	50–55	...
541,920	Stk.	Nov. 30	4	4%	Newcastle & Gatsh'dCon.	98½–99½	79⅜–80⅜	79–79½
1,575,892	,,	Feb. 22	4½	5½%	Do. 4 p.c. Pref. Stk.	..	76–78	...
250,166	,,	,,	—	4%	Do. 3½ p.c. Deb.	82–83	68–69	...
529,705	,,	Dec. 29	3½	3½%	North Middlesex 10 p.c.	..	..	...
15,000	10	Aug. 26	—	7/6	,, ,, 7 p.c.	14–15	10½–11½	...
55,940	10	Mar. 8	7/14/0	7/8⅜	Oriental, Ltd.	117–122	97–102	98⅜–99⅜
300,000	Stk.	Nov. 30	8	8%	Plym'th & Stonh'se 3 p.c.	..	94–99	...
188,120	Stk.	Dec. 29	—	72/6	Portsea Island, B	128–131	95–103	...
60,000	50	Mar. 8	13	65/–	Do. C	118–121	95–102	...
100,000	50	,,	12	60/–	Primitiva Ord.	5½–6	⅜–½	10/11
290,069	5	—	8	—	Do. 5 p.c. Pref.	4½–5	1½–2½	37/6–38/9
499,960	5	—	5	—	Do. 4 p.c. Deb.	91–93	70–73	70
521,600	100	Nov. 30	4	4%	Do. ,, ,, 1911	..	55–58	...
600,000	Stk.	Jan. 25	4	4%	River Plate 4 p.c. Deb.	85–87	55–58	...
346,198	,,	Dec. 29	4	4%	San Paulo: 6 p.c. Pref.	10½–11	5½–6*	...
150,000	10	Mar. 22	6	6/–	San Paulo: 5 p.c. Deb.	47–49	36–38	37–38
125,000	50	July 3	5	5%	Sheffield A	223–224	93–96*	96
135,000	Stk.	Mar. 22	10	5%	Do. B	222–224	93–96*	96
209,984	,,	,,	10	5%	Do. C	220–222	93–96*	...
525,500	,,	,,	10	5%	Shrewsbury 5 p.c.	..	..	...
133,201	Stk.	Sept. 15	4	4%	South African	10½–11½	7–9	...
90,000	10	Nov. 2	9	7%	South Met. Ord.	111–113	94–96	94–95⅛
6,509,895	Stk.	Feb. 22	5/4/0	60/–	Do. Red. Pref.	..	95–97	...
250,000	,,	Jan. 11	—	5%	Do. 3 p.c. Deb.	72½–74½	59–62	60½–61½
1,395,445	,,	,,	3	3%	Do. 6½ p.c. Deb.	..	104–106	103⅛–100
734,000	,,	Mar. 8	—	6½%	South Shields Con. Stk.	157–159	115–117	...
91,500	,,	Feb. 22	8½	8½%	S'th Suburb'n Ord. 5 p.c.	114–116	98–101	100
1,087,795	,,	,,	6	6%	Do. 5 p.c. Deb. Stk.	116–118	93–98	96
368,837	,,	Dec. 29	5	5%	Southampton Ord.	99–102	84–87	...
647,740	,,	Nov. 2	5	7%	Do. 4 p.c. Deb. Stk.	..	68–73	...
121,275	,,	Dec. 29	4	4%	Swansea 7 p.c. Pref. Stk.	..	102–104	...
250,000	,,	Mar. 8	—	70/–	Do. 6½ p.c. Deb. Stk.	..	102–104	...
200,000	,,	Dec. 29	—	6½%	Tottenham District: A 5 p.c.	135–138	109–114	...
120,000	,,	Feb. 22	—	7½%	Tottenham District: B 3½ p.c.	115–117	100–103	100
782,275	,,	,,	6	6%	Tottenham District: 4 p.c. Deb.	87–89	75–80	...
181,255	,,	Dec. 14	4	4%	Tynemouth 5 p.c. max.	108½–109	87–89*	...
258,251	Stk.	Mar. 22	5	5%	Wandsworth, Wimbledon, and Epsom—			
30,000	,,	Feb. 22	8½	87/6	Wandsworth A 5 p.c.	151–156	125–130	...
285,636	,,	,,	6½	72/6	Do. B 3½ p.c.	129–134	112–117	...
128,075	,,	,,	—	61/3	Do. C	..	97–102	...
140,865	,,	,,	—	61/3	New Ordinary	..	97–102	...
352,000	,,	,,	6½	68/9	Wimbledon 5 p.c.	117–122	107–112	108
98,000	,,	,,	6½	73/9	Epsom 5 p.c.	121–126	110–115	...
88,416	,,	Dec. 29	3	3%	3 p.c Deb. Stk.	66–69	56–59	57½

* Ex Div.

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Sheppy Gas Company.

In submitting to the proprietors the accounts for the year 1922, the Directors had the gratification of reporting that a return to the maximum rates of dividend had been possible. The fall in the price of coal and the decreased wages paid, consequent upon the reduction in the cost of living, during the year, permitted a lowering of the price of gas amounting to 2½d. per therm, equivalent to 11½d. per 1000 c.ft. The Company's consumers have recently been informed of a further reduction of 1d. per therm, equivalent to nearly 5d. per 1000 c.ft., to take effect from the current quarter's reading of the meters. The depression in trade, however, has had its effect upon the gas sales; and it is earnestly hoped that the position will improve for all concerned. Owing to the existing coal carbonizing plant being expensive to maintain and wasteful in working, a contract has been entered into for its renewal on more modern lines. Considerable saving is assured thereby. To enable the many uses of gas to be demonstrated, it has been decided to alter the Company's office premises for the provision of a showroom. Interim dividends were paid for the first half-year ended June 30 of 4 p.ct. per annum on the "A" preference shares and 5 p.ct. per annum on the consolidated ordinary stock, less income-tax; and the Directors recommended similar dividends for the half-year ended Dec. 31, less income-tax. They also recommended that the usual donation be given to St. Bartholomew's Hospital at Rochester, and that permission be granted to distribute the usual amount of coke to the necessitous.

London County Council Gas Sub-Committee.—A Special Sub-Committee of the Public Control Committee of the London County Council has been appointed to consider questions affecting the London gas supply. Mr. David Davis has been chosen to act as Chairman.

Tamworth Gas Company.—The meeting of the shareholders of the Tamworth Gas Light and Coke Company was held on Wednesday last, Alderman G. Hoskison, Chairman of the Company, presiding. It was decided, on the proposition of the Chairman, seconded by Mr. J. T. Hill, that dividends should be paid of 5 p.ct. on each old share, and 3½ p.ct. on each new share, less income-tax.

Success of the Wandsworth Gas Capital Issue.—Tenders for the new issue of stock in the Wandsworth, Wimbledon, and Epsom District Gas Company, recently invited through our advertising columns by Messrs. A. & W. Richards, were opened on Thursday last. The stocks offered for sale were £30,000 of 4 p.ct. debenture stock, at a minimum price of £78 p.ct.; £100,000 of 5 p.ct. preference stock, at a minimum price of £93 p.ct.; and £100,000 of new ordinary stock, at a minimum price of £95 p.ct. They were applied for as follows: Four p.ct. debenture, £207,149; preference, £255,235; and new ordinary, £201,101—the total applications being £663,485. The prices of tenders accepted ranged from £81 to £79 15s. p.ct. in respect of the debenture stock; from par to £94 5s. 6d. for the preference stock; and from £102 to £96 10s. 6d. in the case of the new ordinary stock.

Lewes Gas Company.—An ordinary general meeting of the Company was held on the 22nd inst., Mr. E. Monk presiding. The Directors reported a profit of £2106 for the half-year. After providing for income-tax, interest on mortgage, &c., the balance of net revenue was £1880, and they recommend that dividends for the past half-year be declared at the rate of 4 p.ct. upon the original capital stock, and at the rate of £2 16s. p.ct. upon the additional capital stock. These dividends, after the deduction of income-tax, would amount to £890. The Chairman said that considering all the circumstances it was very satisfactory that they were able to carry to profit and loss account £206. They had received no complaints. The calorific value had been well maintained, and there had been a decrease in the amount spent on coal during the half-year, the amount being £5180 against £7162 for the last half-year. The Directors looked upon the coal question with apprehension. He contended that the coal miners were chasing a will-o'-the-wisp in seeking increased wages in the endeavour to catch up with increased prices. The position on the Ruhr was also likely to raise the price of coal in this country, and make it difficult to obtain. He expressed doubt if it was a wise policy to supply the Germans with coal, which was the breath of the industrial life of this nation. It was somewhat difficult to compare the sales of gas owing to the difference in the method of charging, but there was not much variation. Mr. J. M. Every seconded the motion. The report was adopted and the dividends recommended declared.

Considerable extensions are proposed at Poulton-le-Fylde Gas-Works; and the District Council have asked for tenders for increasing the plant and storage.

The Battle Gas and Coke Company having asked the Urban District Council for leave to lay a certain new main, the Council decided to grant the necessary permission, on condition that all damage was made good and the main laid to a depth of 3½ ft.

Tully Gas Plants, Ltd., have several slides illustrating their apparatus, which they will be pleased to lend anybody interested in the subject who is giving a lecture accompanied by lantern slides. Application should be made to the firm at No. 47, Victoria Street, S.W.

Estimates were presented at last Friday's meeting of the Darlington Gas Committee showing an income for the year of £118,600 and an expenditure of £102,000. After payments on loans, interest, and taxes, there was shown a net profit of £3390, out of which it is proposed to give £3000 towards the relief of the rates. The reserve now stands at £25,000.

Because a St. John's Wood wireless enthusiast had fastened the earth wire of his receiving set to a gas-pipe, an insurance company were said to have refused to continue the insurance of the house, and the owner, a woman, asked the advice of the Marylebone Magistrate. "I am afraid the wires will attract lightning," she said. "It seems so dangerous when the apparatus is connected to the gas-pipe." The tenant, she added, had refused to dismantle his set. The woman was advised to go to the County Court.

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Continued on p. 850.